THE AMERICAN ARCHITECT

VOL. CXIX WEDNESDAY, JANUARY 19, 1921 NUMBER 2352

# Program of Competition for a New Group of Buildings for the New Britain, Connecticut, State Normal School

PROPOSED BUILDING: The State Board of Education of Connecticut proposes to erect a new group of buildings for the New Britain, Connecticut, State Normal School on property facing upon Stanley and Wells streets at New Britain.

PURPOSE OF THE COMPETITION AND AGREEMENT AS TO FEES: The Board, having in hand a sum sufficient for the purpose, desires to secure through this competition preliminary sketches by means of which it may ascertain the probable cost of the accommodations desired, preparatory to the introduction of a bill in the State Legislature to carry on appropriation for the erection of the necessary structure or structures. It therefore proposes to hold a Limited Competition for the selection of an architect to prepare the preliminary sketches and estimate of cost referred to. The competition drawings will be few in number and small in scale with the least possible degree of elaboration in presentation. The winner must be prepared to begin to develop the preliminary sketches in consultation with the Board immediately upon the close of the competition and to complete them as soon after the first of January, 1921, as practicable and not later than February 1, 1921. These preliminary sketches must be of the character usually prepared by architects of those invited in this competition for the purpose of determining the approximate cost of important buildings and grounds; and the successful competitor must be prepared to provide also a water color perspective drawing of the exterior. For the professional services rendered in connection with these preliminary sketches, the scale and number of which are to be determined upon between the successful competitor and the Board, the Board agrees to pay the successful competitor the sum of $12,000, which shall be inclusive of his fee as competitor and of which sum he shall be paid $3,000 on account within ten days of the date of the award.

The Board fully expects and intends to employ the architect successful in this competition to render full architectural service as defined by the American Institute of Architects, but should the Legislature of the State of Connecticut fail to make an appropriation for the purpose of building the structure or structures within three years from January 1, 1921, this agreement to employ the successful competitor becomes null and void. In the event that the State Legislature should subsequently make an appropriation, a new agreement shall be entered into between the State Board and the successful competitor. In either case the $12,000 already paid him shall be paid and received as a payment on account of the total architect's fee. The unsuccessful competitors shall be paid the sum of $750, each within ten days of the date of award.

PROFESSIONAL ADVISER: The State Board of Education has appointed as its professional adviser H. Van Buren Magonigle, architect, 101 Park avenue, New York City, to assist in the preparation of this program and to act as its adviser in the conduct of this competition, including the making of the award.

EXAMINATION OF DESIGNS AND AWARD: The Professional Adviser will examine the designs to ascertain whether they comply with the mandatory requirements of the program and will report to the Board any instance of failure to comply with them. The Board agrees that it will satisfy itself of the accuracy of the report of the Professional Adviser and will place out of competition and make no award to any design which does not comply with the mandatory requirements.

The Board and the Professional Adviser will then proceed to the examination of the remaining drawings and will make the award by secret ballot and by majority vote before opening the envelopes which contain the names of the competitors. In making the award the Board and the Professional Adviser will thereby affirm that they have made no effort to learn

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XUM

the identity of the various competitors, and that they have remained in ignorance of such identity until after the award was made.

The opening of the envelope containing the name of the author of the selected design will automatically close the contract between him and the Board, as set forth in Paragraph 2 hereof.

EXHIBITION OF DRAWINGS: It is agreed that no drawings shall be exhibited or made public until after the award and that no design shall be made public without the consent of the author.

USE OF FEATURES OF UNSUCCESSFUL DESIGNS: Nothing original in the unsuccessful designs shall be used without consent of, or compensation to, the author of the design in which it appears.

In case the Board desires to make use of any individual feature of an unsuccessful design, the same may be obtained by adequate compensation to the designer, the amount of such compensation to be determined in consultation with the author and the Professional Adviser.

COMMUNICATIONS: (*Mandatory*) If any competitor desires information of any kind whatever in regard to the competition or the program he shall ask for this information by an unsigned letter on plain paper addressed to the Professional Adviser, and in no other way, and a copy of this letter and the answer thereto will be sent simultaneously to each competitor, but no request received after October 2, 1920, will be answered.

ANONYMITY OF DRAWINGS: (*Mandatory*) The drawings to be submitted shall bear no name or mark which could serve as a means of identification, nor shall any such name or mark appear upon the wrapper of the drawings, nor shall any competitor directly or indirectly reveal the identity of his design or hold communication regarding the competition with any member of the Board or with the Professional Adviser or with any other person connected with the State Normal School, except as provided for under "Communications."

This program contains all the data necessary to the competing architects as a basis of their sketches and inquiry from miscellaneous sources is futile; the communications of the Professional Adviser with the competitors will therefore be limited to matters of interpretation. The award will be made upon the evidences of general grasp of a problem of this nature exhibited by the sketches. It is understood that in submitting a design each competitor thereby affirms that he has complied with the foregoing provisions in regard to anonymity and agrees that any violation of them renders null and void this agreement and any agreement arising from it. With each set of drawings must be enclosed a plain opaque, sealed envelope without any superscription or mark of any kind and which shall contain the name and address of the competitor. These envelopes shall be opened by the Professional Adviser in the presence of the Board after the award has been made.

DELIVERY OF DRAWINGS: (*Mandatory*) The drawings submitted in this competition shall be securely wrapped and addressed to H. Van Buren Magonigle, Professional Adviser, care of Marcus White, President of the State Normal School, New Britain, Conn., in plain lettering and with no other lettering thereon, and be delivered at this address not later than midnight of Monday, November 8, 1920.

## PART II.

SITE: The site of the building is shown upon the accompanying survey and the competitors must visit the site before beginning their sketches. All the approaches to the future school will be of practically equal importance. The street car line which now terminates a very short distance south of the southerly line of the property will probably be extended and pass the whole frontage; and the districts east and west of the site will become important in time.

COST: Recognizing that it is impossible in the present condition of the building industry to estimate the cost of a building by any cubic foot rate formerly in use, the Board advises the competitors of its hope that the desired accommodation called for with the exception of the future dormitory may be secured by an expenditure of about nine hundred and fifty thousand dollars and that wasteful planning, excessive heights and an undue degree of elaboration in workmanship or materials will militate against the success of the competitor.

DRAWINGS: (*Mandatory*) The drawings submitted shall be as follows, at scale given and rendered as noted, and no other drawings than these shall be submitted.

*a.* A general plan showing the entire property, with present contour lines, with roads, paths, playgrounds and existing or proposed plantations and the new buildings in outline to be at a scale of sixty-four feet to the inch rendered in monotone wash.

*b.* The several floor plans of the main building, such plans of the dormitory building as required to show dining room arrangements, a front and a side elevation and a section taken at will as best explanatory of the design, at a scale of 32 feet to the inch.

These drawings shall be in pencil, on white paper or tracing paper without shadows, and without any accessories. The plans and sections may have a gray wash on all wall and floor sections. All of these drawings shall be mounted on cardboard (it is recommended that owing to the wear and tear of handling the drawings shall be mounted solid).

DESCRIPTION: A brief description of the design, covering those points not made manifest by the

drawings and particularly stating the materials proposed, etc.

ARBITRATION: Any difference in opinion between the Board and any competitor arising under this program shall be referred to arbitration, the Board and competitor each selecting one person and these two selecting a third. The decision of two of these persons shall be final and binding upon all parties. The Professional Adviser will not be eligible for selection as one of the arbitrators.

SCHEDULE OF ACCOMMODATIONS: *General.*

Item 1: A main building for administration and instruction.

Item 2: A dormitory to accommodate 100 students, with a few rooms suitable for teachers. Kitchen and dining room facilities.

Item 3: Provision either in main building or in dormitory for a lunch room (for lunches only) to accommodate 200 non-residents in the dormitory. At competitor's option kitchen facilities, but not dining room, may be combined for Items 2 and 3.

Item 4: The design should permit the erection of a second future dormitory in proper relation to the other buildings.

Item 5: An adequate heating plant of flexible character, sufficient for present needs and adapted to expansion, both as to structure and equipment.

Item 6: Living quarters for superintendent of building and grounds, which should include a small garage and a small stable for a horse for use in the grounds, sheds for the storage of tools, etc. At the option of the competitor the heating plant and superintendent's quarters may be either (a) combined in one general structure, (b) or in a small separate group, (c) the heating plant and the living quarters may be in the main building.

Item 7: Four tennis courts and a level grassy area for playground purposes for such sports as basketball, base ball, etc.

## MAIN BUILDING.

The figures given are approximate only.

BUSINESS OFFICE: About 400 sq. ft., with office supply closet and sink.

PRINCIPAL'S OFFICE: About 180 sq. ft.

OFFICE OF DEAN: 80 to 100 sq. ft.

OFFICE OF SUPERVISOR OF TRAINING: 80 to 100 sq. ft.

OFFICE OF SUPERVISOR OF KINDERGARTEN: 80 to 100 sq. ft.

RECEPTION ROOM: 80 to 100 sq. ft.

(These require no separate toilet facilities. The two teachers' dressing rooms will suffice.)

A demonstration room on the first floor, with 150 seats arranged in a rising semi-circle, with level space in front for a class of children.

Biology room, about 24x30 ft., sunny exposure.

A library about 50x75 ft., with book shelves in alcoves around same.

A supply room opening out of the library, or adjacent thereto, about 400 sq. ft.

An art room with space for 40 small working tables. Space for supply closets and shelves. This room must have north light, which may be overhead.

An art room annex about half the size of the art room for industrial work, modeling, etc.

A music room for 100 students, so placed as to disturb as little as possible the rest of the school.

About ten recitation rooms, approximating 24x30 ft., and of which two or three should be half this size.

An assembly hall to seat 450, with an inclined floor; a stage about 25 ft. deep, with adequate wings and fair gridiron space above.

A gymnasium, 50 to 60 by 75 to 80 ft., without a running track; spectators' gallery if possible, and outside light.

An office for the physical director.

A room for gymnasium supplies, physical examinations, etc.

A students' sick room, with toilet. This is to be arranged adjacent to the gymnasium, the physical director being in charge of the general health of the students.

A locker room, in connection with the gymnasium, for 250. At least 12 shower baths, 2 W. C.'s, 2 wash bowls.

A teachers' cloak room for 12 women, with wash room and toilets adjacent.

A teachers' rest room.

A dressing room for 6 or 8 male teachers, with wash room and toilet facilities.

Students' (girls) cloak room or rooms, a total of 350 lockers, with proper wash room and toilet facilities. There may be two or more locker rooms at competitors' option with a total capacity of 350.

Janitor's supply rooms, closets, sinks, etc.

Drinking fountains at proper points in the plan.

The following four rooms should be grouped together:

The science lecture room: 100 seats arranged in a rising semi-circle, with demonstration table, suitably equipped.

Laboratory for physics and chemistry to accommodate 40 students.

A work room about 24x30 ft.

A science supply room, about 400 sq. ft.



XUM

# Factory Production Applied to Housing

## Robert Tappan, New York Architect, Addresses National Housing Association

IT has been said that it requires the services of one hundred thousand different workers to satisfy the normal needs of any one individual. I feel that this is an understatement. In our complex civilization the productive forces of the wide world are drawn upon to supply us with what we usually consider the ordinary necessities of life. Food, clothing and shelter naturally form the basic production problems of the entire earth. The National Housing Association is concerned with the last of these.

Nature has been kind enough to furnish to us gratis many elemental food products, ready for consumption. She also provides the material for our clothing; ranging up through several degrees of raw material to partial manufacture. In one climate clothes are obtained from her practically ready-made; in another, clothes do not figure as a prime necessity. But for housing—there we are left to shift for ourselves—and what a mess generally we make of it! Not that there are no good and sufficient reasons for our shortcomings and mistakes.

House building is the oldest craft. We soon outgrew cave dwelling. Perhaps some prehistoric board of health condemned caves as dark, damp, dismal and generally deficient in serving the best interest of the community; or better still, let's imagine that some rapacious landlord jumped the rent or cut down on the heat. At any rate, some one among our early ancestors built himself the first house. It couldn't have been much to look at, but it had the merit of novelty and did not resemble anything else on the street. Immediately, artificial hand-made houses became the vogue. Cave dwelling simply wasn't being done—and so, perhaps, the ancient and still honorable profession of the house builder was born.

Houses are still largely hand-made. It requires the labor of twenty different trades to build a quite ordinary and unpretentious modern cottage. Behind these trades or crafts are lined up literally thousands of skilled experts, each performing some highly developed specialty and each a necessary factor in the successful and economical making of the house. As an architect, nothing has caught and held my imagination more than the realization that every line I draw will tend to set in motion, or keep in motion, some wheel, somewhere, in this gigantic, world-wide machine.

No other necessity in life remotely approaching the dwelling house in importance, is produced today by so many different skilled hand workers, laboring in the open, at tasks that shift and vary from minute to minute and job to job. Behind these expert field craftsmen are thousands of others who also shift and vary their work to meet the demands of the home builder. My object in this address is to try to tell you how some of this vast machinery can be simplified.

Wood is a basic building material. In one form or another it enters every home. It is living, a growing raw product, that requires only intelligent cultivation to constantly replenish the earth's timber reserves. Lumber production is notoriously wasteful, and its use after production is even more so.

It had been my plan to interest some big lumber producer in manufacturing wooden houses for me right where the trees grew. I believed that many economies could be made in the production of lumber, scientifically standardized to fulfill certain clearly defined purposes.

Lumber, such as is used in ordinary house building, is standardized by trade custom into certain definite sizes, shapes, lengths and grades. The logs are carefully sorted and cut to meet current demands. An average day's run produces 10 per cent. of waste and 15 to 20 per cent. of low grade stock too short to fit the regular standards. Lumbermen conservatively estimate that 10 per cent. of the log, in the form of slabs and trimmings, goes to the burner, because of the lack of demand for short-length material.

Now one-third of the ordinary framing lumber usually used in building a six-room workingman's house can be obtained from material running under eight feet in length. One-half of the expensive finishing lumber used for flooring and dressing up the interior and exterior of the house also can be made from short-length stock. Does it not seem wise to get together with the lumberman with a view to utilizing this discarded, so called, low grade material? I thought so and attempted to do so, but there were a few obstacles in my path.

In the first place, a lumberman is a manufacturer. Now a manufacturer thinks in different terms from an architect, a carpenter, or other professional craftsmen. He speaks a totally different language; using such words as cost, equipment, production, merchandising, credits, transportation, storage, financing, publicity, stock holders, directors, profits—and a host of other terms that were quite new to me. So I found



XUM

it hard to interest him in my very simple idea. Finally, by studying up on some of these unknown words, I was able to get together and sit in with some who listened long enough and patiently enough to get the drift of my thoughts. I found that we had very much in common and that we were not so very different after all. They looked upon themselves as quite as useful and necessary members of society as were professional men. They dared to dream dreams with me and to make plans for the ultimate good of humanity. Only it had to be done in a way they understood—a way that was practical and businesslike.

In theory it had seemed that the producer ought to be able to make up complete consignments of carefully standardized lumber sufficient to construct one house, and he should be able to ship this lumber, packed in a box car, directly to the individual home builder, at a saving to him of at least 25 per cent. The lumber required to construct an ordinary six-room house represents about 35 per cent. of its total cost and the carpenter bill amounts to 15 per cent. more; so in dealing with this subject we are working upon a very important factor in the high cost of home building. It certainly looks as though the producer and the consumer ought to be brought in close contact for their mutual benefit, but unfortunately, it is impossible for the lumber manufacturer to produce economically for direct retail distribution. He must manufacture in large quantities or his whole system of lumber production will be slowed down to an unprofitable pace. This fact, together with orders equally significant in allied industries connected with house building, forced the conclusion that the only way to secure manufacturing economies was to standardize the product, manufacture it in quantities and seek wholesale markets.

Efficient factory production is inconceivable without standardization. Can American dwellings be standardized without sacrificing reasonable individuality? That is debatable. However, we are dealing with a vital necessity of life, that has grown constantly more expensive to supply. Personally, I feel that I could stand any quantity of standardized houses so long as each individual home was attractive in appearance and I knew that its inhabitants were not starving or freezing themselves to death to meet the monthly payments. It has never occurred to me to criticise nature for standardizing her products, or to rail at a field of daisies because they were all white. Why modern men and women, who go out of their way to dress, eat and think alike, persist in housing themselves in structures that represent the styles, modes and whims of every age and clime, is too much for my comprehension. It was not always thus. Can it be that we architects are to blame?

After many months spent in study and experiment, I devised a series of house organisms that combined a reasonable amount of convenience and attractiveness with a fairly economical use of lumber and lumber labor. The floor plans were designed in units, a method that has been in vogue in Japan for centuries. While the Japanese are a nation of individual home dwellers, and famous for the artistry that pervades so many of their products, it is curious to observe that their homes are decidedly lacking in architectural pretension. If there is no attempt at architectural display in the dwellings of Japan the traveller is at least spared those miserable experiences he so often encounters in his own country, where, to a few houses of good taste, he is sure to pass hundreds of perforated boxes embellished with grotesque and offending abominations. From one end of Japan to the other, house plans are designed in terms of a standard unit of measurement, the floor mat. The dimensions of the mat are three feet wide by six feet long. The architect marks on his plan the number of mats each room is to contain—this number defining the size of the room; hence the lumber used must be of definite lengths and the carpenter is sure to find those lengths in the lumber yard. It follows that but little waste of lumber occurs in the construction of a Japanese house. It had occurred to me that an adaptation of this system of unit planning might result in a similar saving in lumber here in America if I could get the lumber producer interested in cooperating. I employed a unit or module of sixteen inches, as that spacing is in common enough use among our carpenters, though generally ignored by architectural designers. This unit, when faithfully followed throughout an entire house organism, permits the use of a few simple standard lengths of lumber that can be used in many places in scores of differently designed houses. The floor, wall and roof boards, for example, may be cut in multiples of four feet, and be nailed in place without waste. There is a technique of unit planning just as there is in playing the piano (its keyboard is only so many units), and the longer I practice at unit design the more valuable the idea proves to be. Next, I carefully scheduled all of the lumber and submitted my complete details to several manufacturers for their estimates. The result was gratifying. Instead of saving 25 per cent., I found that we could lower the cost 50 per cent.

This was interesting, but it is not the whole story. There are other significant savings that can be made. We have found that unit design and standardized wooden construction speeds up the work all along the line. The psychological laws underlying the wonderful manufacturing efficiency of our great modern industrial establishments work out just as truly when they are applied to standardized house



XUM

construction. If this paper were not confined to one topic I could tell you of a quantity of experiences that I have had in proving out Ford car production methods on carpenters, painters, plumbers and other house-building craftsmen. There is absolutely no doubt in my mind but that the housing problem, from the point of view of economical production, will solve itself eventually.

Today we are passing through the throes of a great change. A new world is being born. Old, outworn methods are being discarded and new ones are taking their places. There are many who deplore and even resist the onward march of industrial progress. They prophecy the death of all craftsmanship and art. I do not. No one has more respect for the time-honored building crafts than have I. It has been my privilege to be intimately associated with expert craftsmen in many lines on a number of important gothic churches and cathedrals. I have worked with artists and appreciate the thrills of inspiration and the joy that every true craftsman feels in creative accomplishment, but I firmly believe that the time-honored methods of the house-building crafts, easy-going and haphazard as they certainly are, represent a distinct menace when applied to the construction of this great necessity of life. Food and clothing are no longer produced by mediaeval processes; houses still are, with an added complication, that the modern house is by no means so simple as was its early ancestor. In the old days materials were obtained locally, skilled labor cost next to nothing and mechanical installations were unknown. Today the meanest residence that an enlightened craftsman will inhabit requires the services of thousands of experts to construct. Any new factory production methods that will tend to simplify and lower the costs of modern workingmen's homes ought to be welcomed, not resisted.

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# The Extension of Paris

A SPECIAL meeting of the London Society was held in the hall of the Royal Society of Arts some time ago to hear a paper on "L'Extension de Paris," by Monsieur Louis Bonnier, Inspector-General des Services Techniques d'Architecture et d'Esthetique (representing the Prefet of the Seine).

After referring to the way in which the great cities had gradually drained the population away from the country, he is reported in the *Architects' Journal* of London, as saying that the advent in our history of these formidable masses of population demanded a new school of therapeutics and surgery. The machinery of the town being much more complex becomes more fragile and at the mercy of the slightest mishap, such as an abnormal flood or an unexpected strike. What would be the position tomorrow if we had masses of population amounting to ten millions of people? He then touched on the history of Paris and the efforts that were made in the time of Phillippe Auguste, Charles V. and Louis XIV, to arrest the growth of Paris by statute. It was only at the end of the eighteenth century that public opinion began to take an interest in the beautification of the city, the first actual plan being prepared by Verniquet in 1790. He then referred to the efforts of the various periods up to the time of Napoleon III., who, with his Prefet Haussmann, dreamed of the complete transformation of Paris. Though these works are still the wonder of the world, yet they have become quite insufficient for Paris of the present day. The advent of the motor vehicle created requirements which could not be compared with those of pre-war days. At a point where four years ago one horse fiacre passed, now there were perhaps four or five taxicabs. What would be the state of affairs, he asked, when normal conditions were re-established, seeing that France possessed only one motor for every 400 inhabitants, while the United States had one for every 14 inhabitants. Evidently we must be prepared for an enormous increase of motors on the streets of Paris. He suggested that a strict regulation of vehicles would be necessary in the future, and that it would be necessary to consider the suppression of heavy vehicular traffic in the center of the city, the reduction of footpaths for the benefit of the roadway, and even the removal of the stalling of the terraces before the shops and cafes, which give Paris so much character.

A law was passed just before the war that made it obligatory on every town of 10,000 inhabitants and over to prepare a scheme of improvements.

Monsieur Bonnier then described the various studies they had made of the movements of population, etc., in Paris, in order that they might be able to properly consider the probable needs of the future. He mentioned that they had come to the conclusion that it was necessary to include in the City of Paris any neighboring communes with more than 100 inhabitants to the hectare; while of the remaining districts, which they considered as Greater Paris, those where the inhabitants numbered between 10 and 100 to the hectare. He mentioned that though this lowest figure of 10 to the hectare was



XUM

arbitrarily selected by them, they found it was justified by later experiments, and it was an undoubted fact as soon as the figure of 10 per hectare was exceeded then for the first time the influence of Paris began to make itself felt.

The lecturer proceeded to show cinematograph films that he had had made: one showing the successive development of Paris, the other of its suburbs during the course of the nineteenth century. These films have been prepared from plans all drawn to one scale, which show the growth of the city at various stages, then being all run through the cinema quickly they give a graphic idea of the population's increase. The "agglomeration" of Paris covers a total area of 49,483 hectares, bordering on the Department of Oise and Seine-et-Marne. In 110 years the area has increased in the proportion of 1 to 14.4; the population 1 to 7.9. They had tried to find out from their investigations what would be the population of Paris 50 years hence, and came to the conclusion that it would be 14,-300,000 in habitants, a figure not more startling to us to-day than would have been the actual population of 1911 to the inhabitants of Paris 50 years earlier.

After referring to the well-known axiom of town-planning, which laid down that it is the public transport services which are the key to the extension of the town and the distribution of its inhabitants, he proceeded to mention the efforts they were making for safeguarding the most precious monuments of the past in the city of Paris. He said that both the French and ourselves belonged to countries the soil of which, in addition to the natural riches, had clothed itself with an incomparable robe of buildings of many descriptions, which constituted a national treasure that it behooved us to safeguard and keep at all costs.

He said that these monuments of the past marked the character of the town and determined the pivot of its embellishment. Though sometimes they were a cause of difficulty to the town planner, yet, like difficulties in other matters, they could be made a pretext and a reason for ingenious and picturesque arrangements. Nothing was so commonplace as the things that arranged themselves too easily. In Paris they were preparing an inventory of all their ancient monuments. After showing various slides illustrating this portion of the work, he went on to speak of the recent Congress and Competition for a Plan of the Future, pointing out that it was impossible to undertake the improvement of a city without first having exhausted all sources capable of furnishing suggestions. From the most grandiose schemes or the most fantastic, one could always gain some inspiration. The City of Paris organized an inter-allied Conference to discuss its extension. He referred particularly to the points on which the competitors were unanimous, such as the necessity for reducing immediately the density of the population and bursting through the narrow boundaries which made Paris the most overcrowded of the great capitals. They all agreed, also, that the industrial population should be gradually brought back again to the North of the City, leaving the intellectual quarter to the South; that more radial and circular lines of railways were needed, and they agreed as to the necessity for the electrification of the railways; the removal to a distance of workshops, carriage depots, and to the reconstruction of roads.

Some competitors suggested that the improvements should be secured by driving large and costly avenues from north to south and from east to west: others that similar benefits could be obtained by better organization and stricter regulations, which might be progressively coercive. Monsieur Bonnier intimated that probably a combination of the two would be found to be the best solution. He referred to the immense importance of beautifying the approaches to the city and to the fact that railway stations had now taken the place of the City Gates. Yet was it not a fact that our railway stations were so designed that their most pleasing features were seen not by the coming but by the departing traveller.

Finally he remarked that though many happy ideas were evolved from the competition, yet even in the best schemes there were some deplorable ones. He spoke most strongly against the theory of the isolation of ancient monuments, pointing out that people were apt to forget that they had been designed for the particular position that they occupied. He objected, also, strongly to the idea that it was necessary to surround ancient monuments with buildings that were supposed to be in harmony with them; nor did he consider it possible to rely on the judgment of administrative commissions in these matters. He said that our great architects of the past could never have executed their "chefs d'œuvres" if a dozen serious gentlemen had been charged to lop off the faults with which they were happily endowed.



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# The Housing Problem Met and Overcome in Prague

*(From our Special English Correspondent)*

WITH us in England the housing problem seems to firmly decline to be conjured by any motions of the official wand. After innumerable speeches, and complicated and dubious expedients, Dr. Addison, who is officially in charge of this question, has produced a bill which has just been thrown out by the House of Lords, with the general approval of the country, but with the result that it leaves this pressing question in an even worse muddle than it was before. After these years of governmental mismanagement one's heart goes out in sympathy to those who—in the little Sussex village where I write these lines—on the sound old principle that the gods help those who help themselves, set to work a few months ago to build their own houses, and by this year's ending will have roofed in three or four very cosy looking dwellings on the bungalow type.

GETTING TO WORK ON THE FOUNDATION
HOUSING BY STUDENTS AT PRAGUE

But we are by no means the only ones to suffer from housing difficulties. I believe that the problem has crossed the Atlantic; and in Europe Prague, the ancient capital of the new state of Czechoslovakia, has had a very acute housing problem. This was particularly felt by the many thousands of students of the University, who could hardly find suitable lodgings. Here too the idea of self help came forward, and found a ready and efficient acceptance. Professor Zahorsky, of the Technical High School, placed at the disposal of the organizations of the students his own patented system of "rapid building." The Municipality of Prague "lent" to them for twenty years the ground required; and soon some two thousand volunteers, all of them students, had started to build a complex of eleven large pavilions, which will provide accommodation and comfortable conditions for 700 students. These will include a central kitchen, dining-hall; laundry, reading-room, etc. The students, as will be seen in one of my illustrations, have themselves dug the foundations for these pavilions, they had even dynamited stone in the quarries, and in fact have, I understand, done the whole work—with the exception of the brick-laying, which was done by professionals.

MOVING THE SOIL
HOUSING BY STUDENTS AT PRAGUE

MOVING UP MATERIAL
HOUSING BY STUDENTS AT PRAGUE

I am told by my friends in Prague that it is very interesting to visit this busy active colony, and see them at work—especially on Saturdays and Sundays, when some 400-500 are to be found working.

CARTING THE STONE
HOUSING BY STUDENTS AT PRAGUE

By an excellent regulation the right to get a room in this colony is only acquired by those who have worked at least 70 hours on the construction. The colony is situated in the modern part of the city, near the Stadium, where last summer the great display of the Sokol gymnastic societies took place; and the girl students do the cooking for their working comrades, that is, for those who are actually working on the construction. The whole movement only commenced some 5-6 weeks ago, and by this time all the eleven pavilions are about completed and occupied by the students.

The system of "rapid building" which Professor Zahorsky has so generously placed at the disposal of the students has the advantage that very solid buildings, with quite a good appearance, can be built of wood, with stone foundations and brick undersettings, without any specialized knowledge of carpentry, for the planks are only nailed together. Our illustrations, which show the students at work, will help in forming some idea of the methods of construction used. The buildings have double walls, with a sort of small ladders between, and the walls are filled with ashes so that the pavilions will keep warm. The result should go far to test, and very possibly establish, the advantages of the method here put in use. In any case, after such interminable discussion, it is a pleasant change to find some people who can take off their coats, and put the work clean through in six weeks.

# The American Specification Institute

FROM an examination of your editorial of November 17 it appears to us that your plan for the American Specification Institute is a good one. We do not know that specifications as now produced are the least creditable portion of the output of an architect's office. While we see other architects' work as published in the magazines we never see another architect's specifications and seldom see any of his detail drawings. We sometimes hear criticisms of other architects' specifications from contractors who use them and have even heard favorable comments on our own.

It would seem to us that if some arrangement could be found by which our specifications could be criticised by some impartial, disinterested architect, or, even better, by such a contractor, it would be of very great benefit.

HARDING & SEAVER.

Pittsfield, Mass.

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I am very much impressed with your suggestions and wish you every success, and would be glad to help. MYRON HUNT, Architect.

Los Angeles, Cal.

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We heartily endorse the formation of the American Specification Institute, about which you write in your editorial November 12. If, as you say, it is wisely formed and managed, it should greatly assist in improving this branch of architectural and engineering work, which, we must agree, is generally not given the attention it deserves.

We await with much interest further information regarding progress of this movement.

SMITH, HINCHMAN & GRYLLS.

Detroit, Mich.

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I quite agree with your view that as a rule the specifications now produced are the least creditable portion of the output of architects' offices, and, holding this opinion, I therefore feel that anything that is likely to improve the character of specification writing and any institution that will turn out men competent to write good specifications should be welcomed by the architectural profession as a whole and certainly would have my hearty approval.

The proposed Specification Institute may be the very organization to handle this work. I am not sure that I understood its purposes and equipment sufficiently to give it unlimited commendation, but, if I understand it correctly, I shall certainly wish for its abundant success.

WILBUR T. MILLS.

Columbus, O.



XUM

# *Trinity Church, Newport, R. I.*

*(See reproduction of original drawing by O. R. Eggers on opposite page)*

*Newport, Rhode Island, sometimes called the social capital of the United States, was even before the outbreak of the Revolution socially and industrially important. During the occupation of Newport by the British, a fire destroyed a large part of the town. Among the few structures to escape the flames was Trinity Church, the subject of this sketch. As a result of military operations Newport became almost depopulated, but through all the vicissitudes of the Revolutionary struggle, "old Trinity" passed safely.*

*In its architecture Trinity resembles many other churches built in New England during the early history of the Colonies, and while preserving the dignity and quiet refinement that characterized the early meeting houses, its chief claim is its association with stirring scenes of early wars and the reverential aspect of the people who stoutly guarded this sacred building from every threatened danger.*

*Old Newport presents a picturesque contrast to the newer section, where now the mansions of the newly rich flaunt their pride of wealth before the observer. In the old town the houses are small, wooden structures, the streets are quaint and narrow and there is a restful feeling about the entire section.*

*In earlier days the waterfront was the scene of bustling activity. Newport is an ideal harbor for ships of even the largest draft. From this port there cleared to sail the waters of the seven seas tall sparred ships whose cargoes formed a considerable part of our American commerce. At that time the spire of Trinity dominated the town and it served as a landmark for incoming ships and a beacon of hope to the home-coming sailor.*

TRINITY CHURCH, NEWPORT, RHODE ISLAND
*THE AMERICAN ARCHITECT Series of Early American Architecture*

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## Europe Turns to American Architects

AN increasing respect for American architects is being manifested by the attitude of Europe. Visitors to these shores from abroad reverse the opinion expressed by foreign guests some thirty years ago. At that time it was generally recognized that American architecture in the finer and accepted sense, did not exist in our promiscuously grouped skyscrapers, which in themselves were ugly.

But today it is different. Arthur Balfour, during his recent trip to this country, referred with unrestrained admiration to "these great cathedrals which you call business buildings." Blasco Ibanez when he was here, declared that in the presence of New York's skyline and the magnificence of its great structures, he felt "a new pride in the achievements of man."

Today America leads in architectural development. The Philadelphia *Ledger* summarizes certain instances of dependence upon us for the restoration of Europe's war-marred places. An American has been asked to plan the restoration of Rheims. An American architect has been invited to rebuild the University of Louvain. And greater yet, one of the largest problems confronting European specialists, the planning of a new Constantinople, has also just been referred to American architects.

These few examples indicate a tendency, but it is logical to assume that only competence has been the basis. If American architects had not made good, not only in America where our own prejudice might discolor merit, but in the opinion of unbiased nations across the seas, the situation would be quite different. It is the practical grasp of the business of architecture, combined with a close knowledge of architecture as an art, that is more and more bringing recognition to the profession, and by a harmonious union of these two attitudes will the profession move onward to an ever better standard.

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## What Is a "Public"?

PEOPLE are naturally egotistical. No better proof of this can be found than our attitude toward strikes and the "public" which those strikes effect. Forget entirely about the right or wrong of a strike. Take it for granted that a strike exists in a municipal street railway system. That is a so-called public utility. As a matter of fact, it is no more a public utility than the hotel one stops in, the restaurant one eats in, or the house one lives in. We have become accustomed to speaking of it as a public utility in a loose sense, and we probably shall continue to do so for a long while.

Precisely as we speak of "the public" in a loose sense in the event of a strike on a traction system. Also, in a selfish and egotistical sense. We find that we cannot get down to work. We are inconvenienced. We have to resort to various makeshifts to reach our place of business. We immediately speak of "the public," which means simply that we are speaking of ourselves and others who want to get down to work on that particular traction system. *That* is "the public" for the time being.

If cooks go on strike, the owners of restaurants set up a wail about the "public" being hard hit. They are thinking and speaking *only* of restaurant owners. It matters little to them if steel erectors are also on strike, so long as such a strike does not immediately and directly affect restaurant owners as a whole.

So it goes. The "public" is always nothing more than ourselves.

One of the best things ever said about the too-often quoted "public" is this by Albert Strauss, formerly Vice-Governor of the Federal Reserve Board:

"The workmen of each manufacturer and producer are the customers of all manufacturers and producers. The great bulk of the working population constitutes the great bulk of the customers of the producers and manufacturers. Unemployment, therefore, tends to perpetuate itself by cutting off the purchasing power of the population; the more that purchasing power is curtailed the more does business fall off, and the more business falls off the more, through unemployment, is the purchasing power of the community impaired."

Careful consideration and study of that paragraph would eliminate a great deal of useless and inane talk about "the public." It would not excuse unjustifiable



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strikes. It would not mean that strikes are right or wrong. It would simply tend to do away with some of the natural egotism which is unfortunately too great a part of every member of the real public.

## Excessive Bidding

CONTRACTORS do not make bids in any way comparable with those made after the work is ready to start and the owner ready to buy. This gives the impression that buildings *will* cost more than they actually do cost. Hence the owner decides not to go ahead . . . . Stabilization of prices and the revival of building will be here when the contractors are ready to quote their *real* prices, so that investors can see their way clear to go ahead and not feel that they are paying a premium to the juggling of prices by contractors."

This paragraph occurs in a letter from one of our correspondents, and is a quotation from a recent interview with one of the country's most prominent architects, a man directly in touch with the administrative affairs of several architectural societies and constantly on the alert to the various factors which operate to the good or evil of the building industry.

Two examples will suffice to show just what this practice means to the building industry. A 20-story building, on which figures were taken recently, was to have seven passenger elevators. They were bid at about $225,000. In another job (a bank building) 14 stories high, and with steel to carry 20 stories, was let at "$1 per cubic foot," according to information given out to the public.

Now as to the first instance. The bid for these elevators was outrageous; almost 100 per cent. too high. Proof of that fact was shown in the action of the elevator company which made the bid. A week after the original bid was submitted a representative of the elevator company which made it called, and said just about this:

"If this building operation goes ahead, we can materially cut the price and close the contract."

Moreover, the steel was bid at $110 per ton, which is in excess of the cost now being used in a building now being constructed in the particular city where all this occurred.

"Contractors," says this same architect, "seem to be afraid to make bona-fide bids. Afraid they might bid too much lower than their competitors. I know how that is from my own experience. Everyone sparring for wind and playing for position."

So much for the first example of this practice.

The second—concerning the cubic foot cost of the bank building referred to—has to do more properly with misinformation rather than with excessive bidding, but it creates an impression of excessive bidding, and is therefore to be spoken of at one and the same breath.

What that $1 per cubic foot *actually* represented in that bank building was practically a total cost, since it included all of the marble and bronze bank fixtures, vaults and other expensive items of a bank, but not, by any means, part of an ordinary office building.

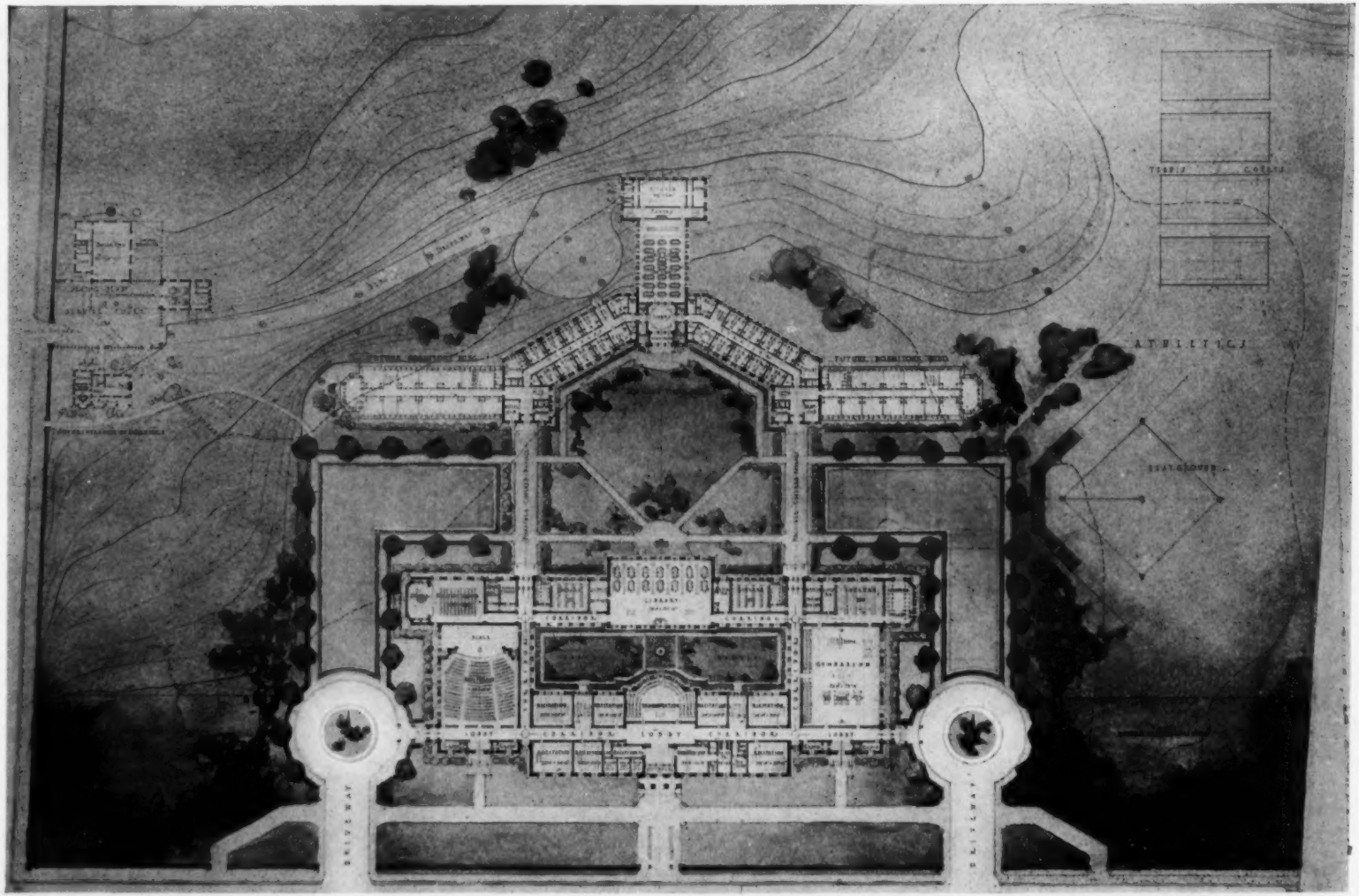
Yet the public, or even architects, who may not have known the real facts of the case, were given the impression that the building itself cost $1 per cubic foot.

What is the value of getting at facts like these?

Simply this: To recognize a condition, produce examples of it based on facts, and then seek a remedy. There can be no doubt that excessive bidding exists. The facts given here are *typical* instances, not detached incidents. They point the necessity for a remedy.

What shall that remedy be? It has been pointed out time and again at conventions of architects, of engineers, of builders, and of every group which has to do with the building industry. It has been repeated so much, and so vociferously, that it has become tiresome to a great many architects. Yet it is the *one* remedy for the thing, and it is summed up in one short word.

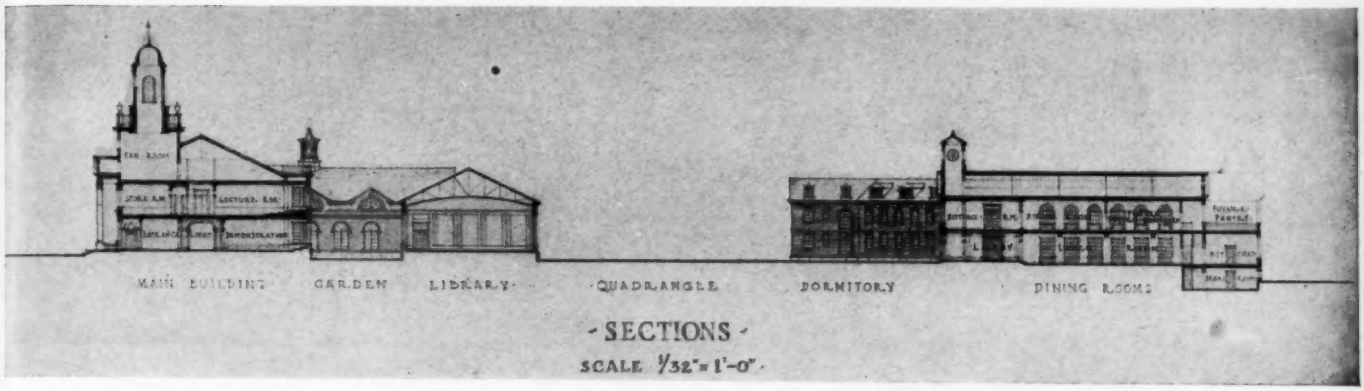
It is needless to print that word.



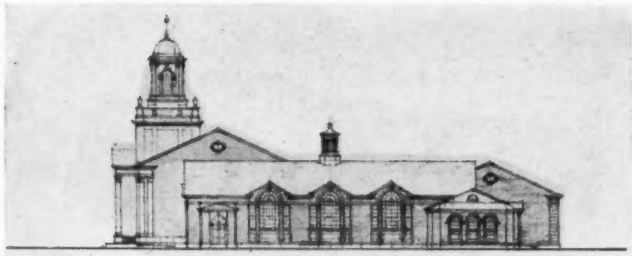
PLOT AND FIRST FLOOR PLANS

COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.

PRIZE WINNING DESIGN—GUILBERT & BETELLE, *ARCHITECTS*




SECTIONS
SCALE 1/32"=1'-0"




SIDE ELEVATION

FRONT ELEVATION

COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.
PRIZE WINNING DESIGN—GUILBERT & BETELLE, *ARCHITECTS*

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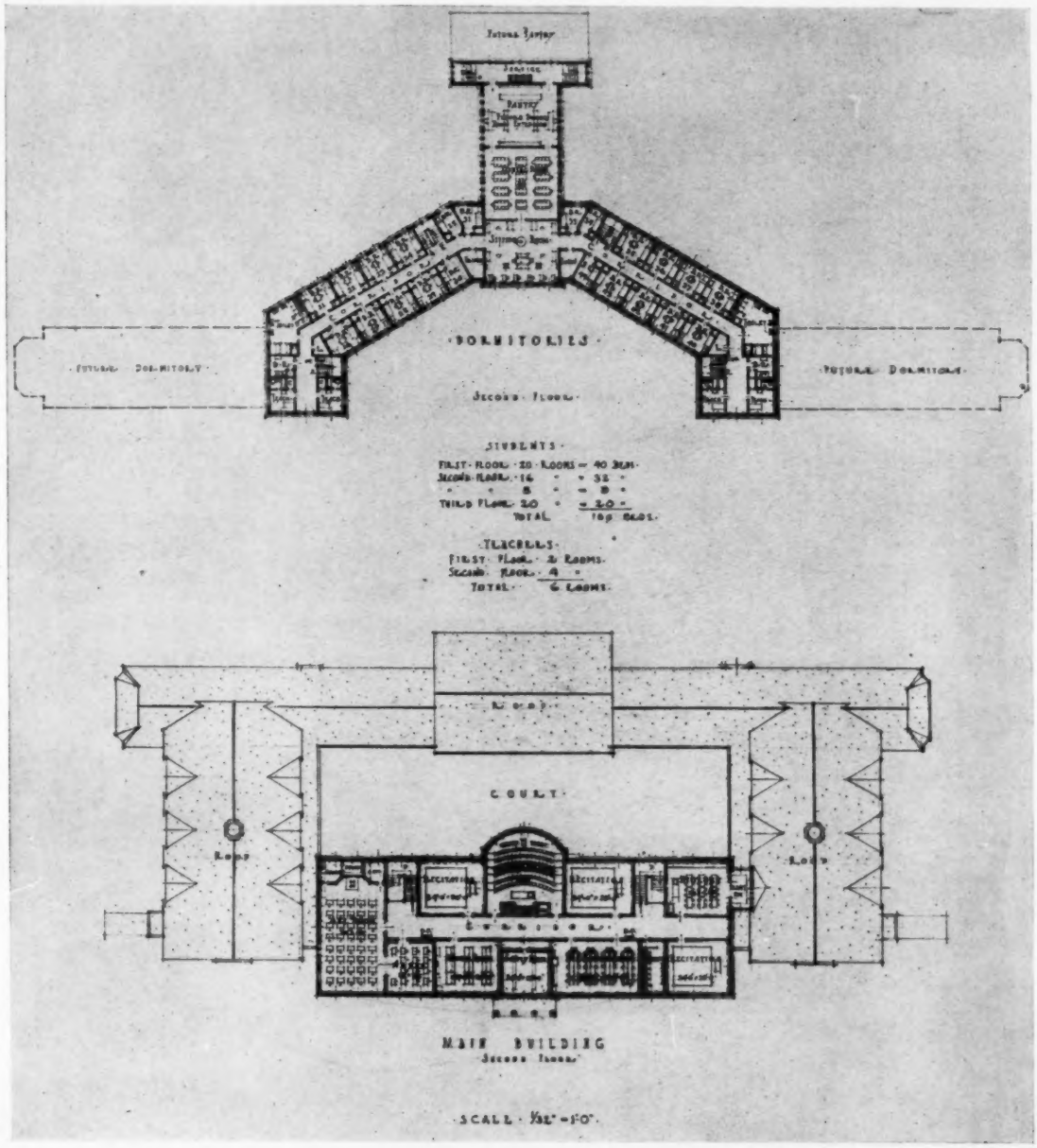
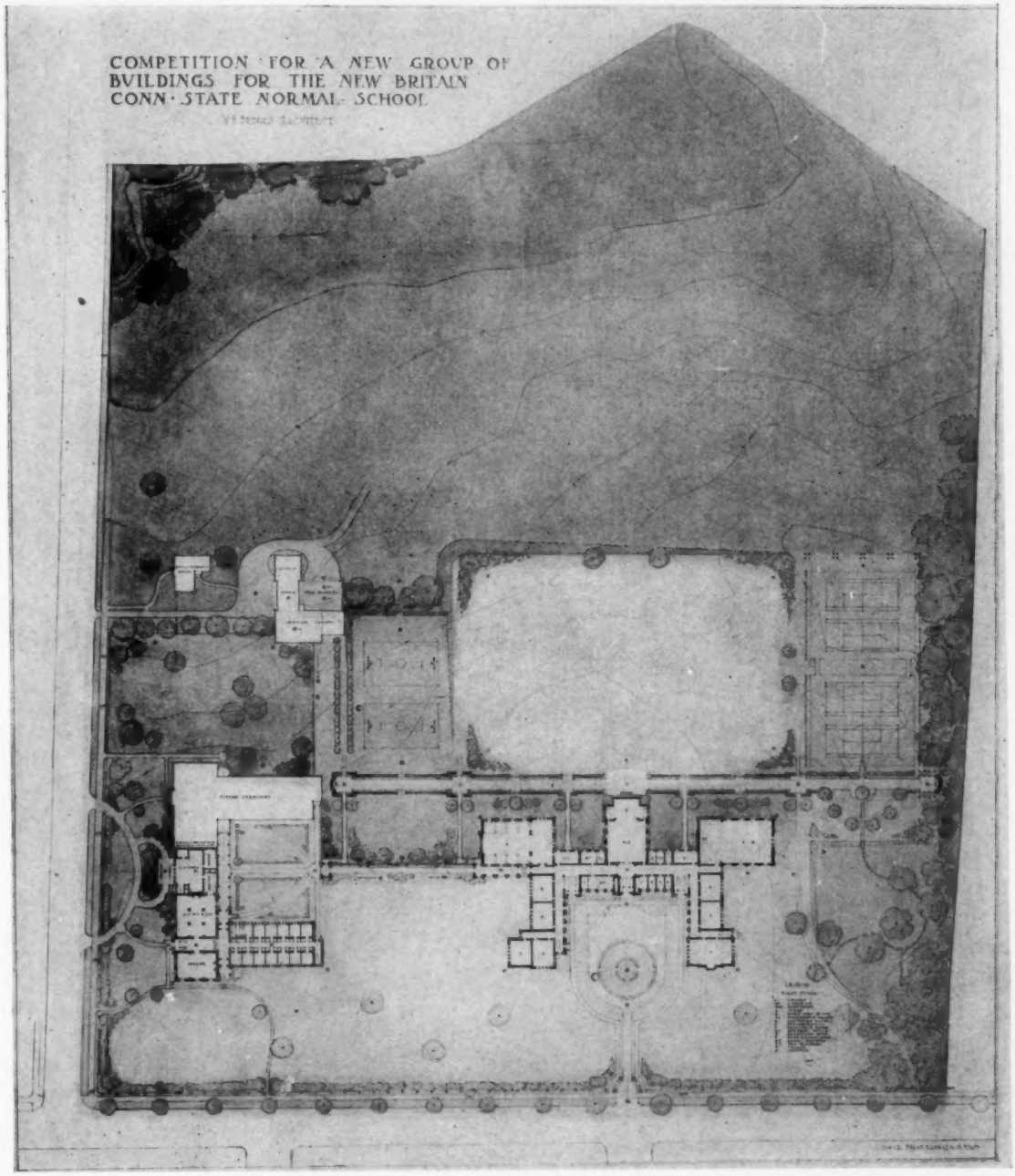



COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.
PRIZE WINNING DESIGN—GUILBERT & BETELLE, *ARCHITECTS*




PLOT AND FIRST FLOOR PLANS

COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.

DESIGN SUBMITTED BY W. F. BROOKS, *ARCHITECT*

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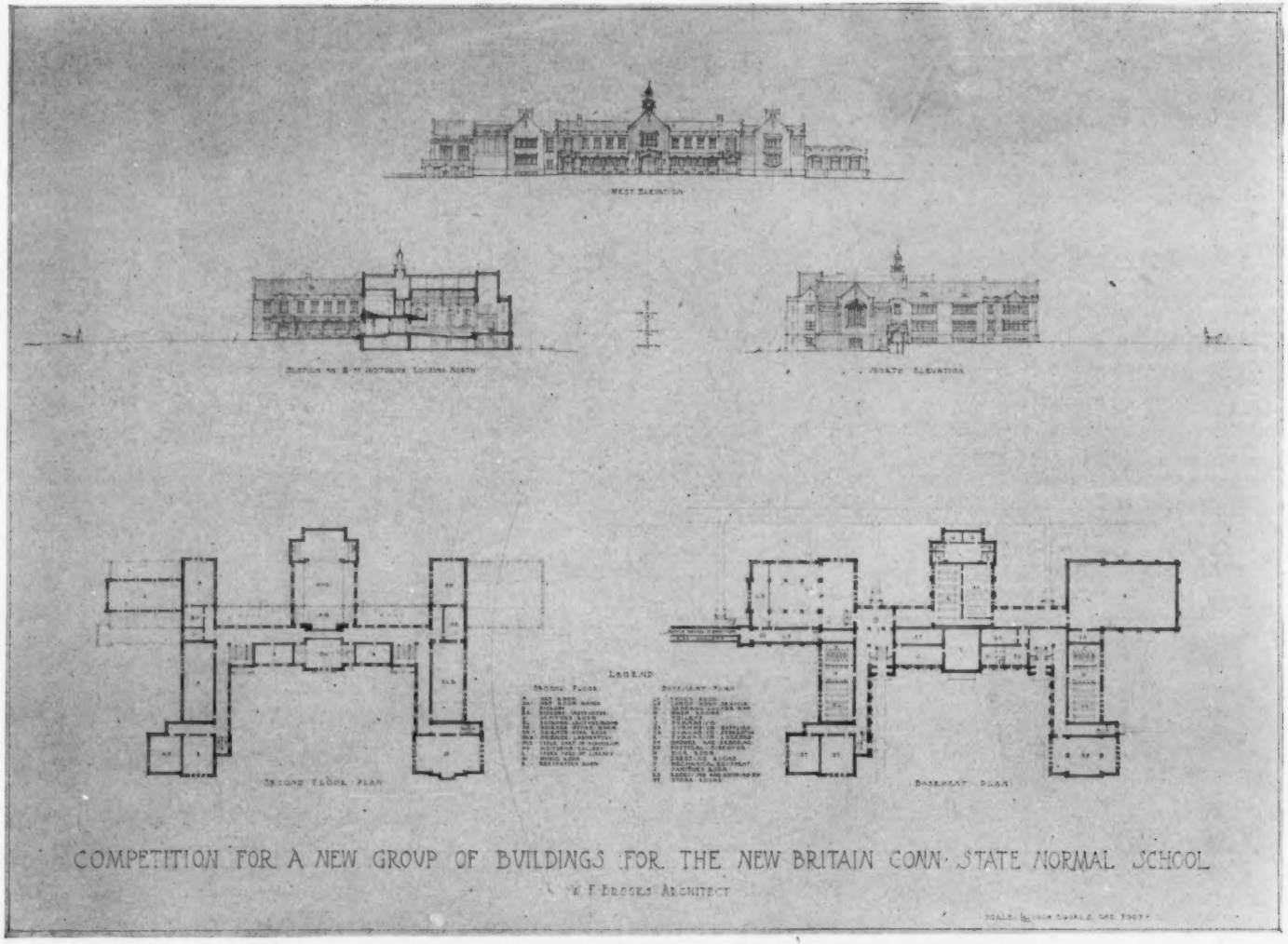


COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.
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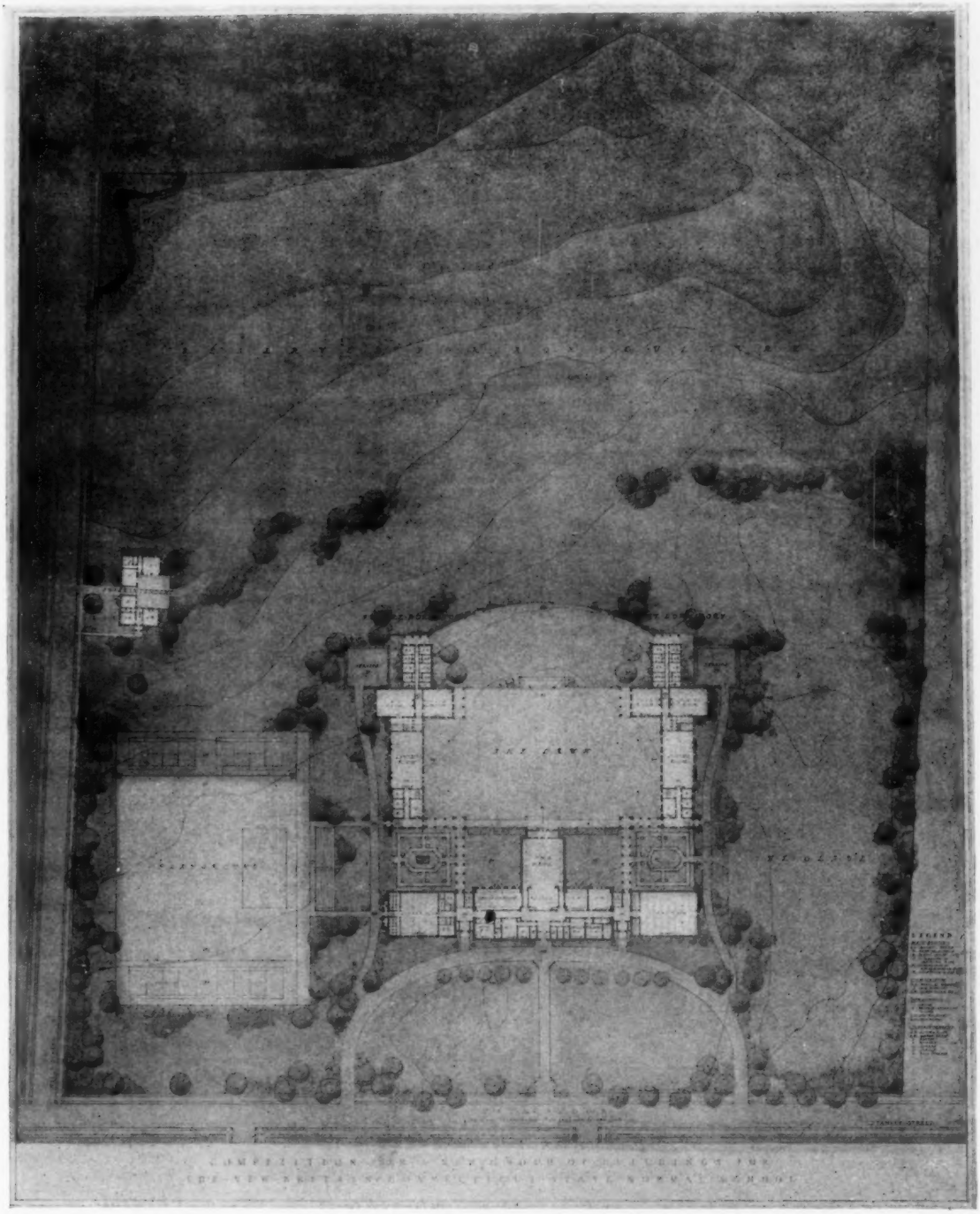

PLOT AND FIRST FLOOR PLANS

COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.

DESIGN SUBMITTED BY AYMAR EMBURY II, *ARCHITECT*

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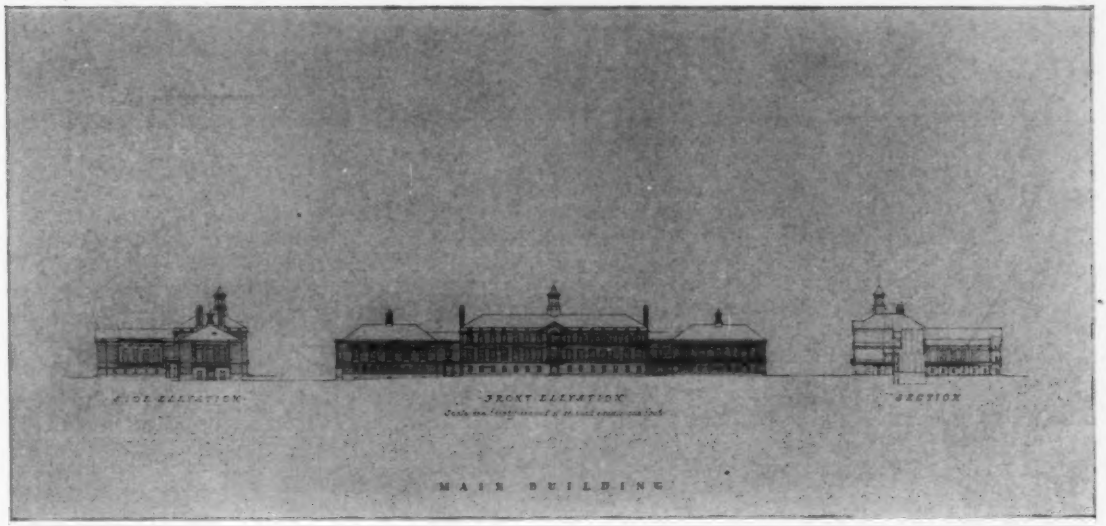
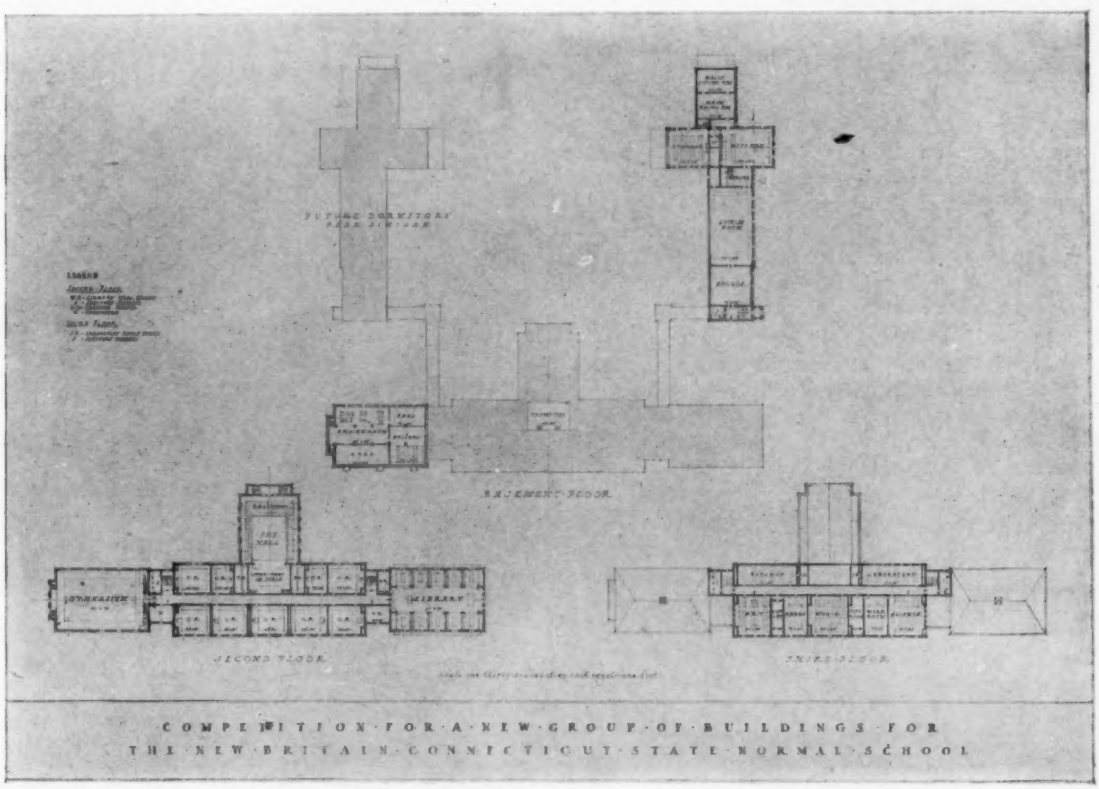



COMPETITION FOR THE STATE NORMAL SCHOOL, NEW BRITAIN, CONN.

DESIGN SUBMITTED BY AYMAR EMBURY II, *ARCHITECT*

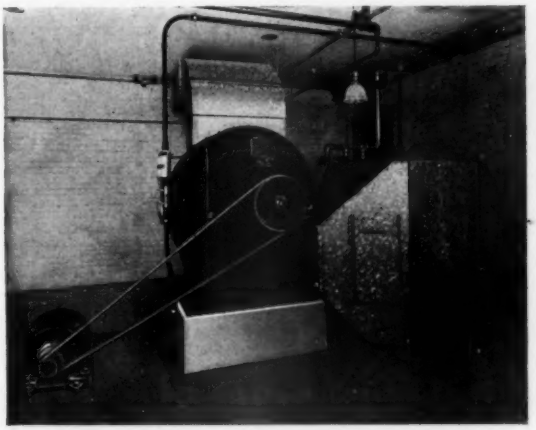
# Heating and Ventilating Industrial Buildings Part III

## Hot-Blast Systems

*By* CHARLES L. HUBBARD, *Heating Engineer.*

THE most satisfactory system of heating for the modern industrial building, especially where the number of occupants is large in proportion to the cubic space, is that employing a fan and heater with a system of ducts for distributing the warm fresh air to all parts of the building.

Various modifications of this arrangement are employed for different conditions, including the recirulation of air; the unit system, without the use of distributing ducts; a combination of supply and exhaust fans, etc., etc., which will be mentioned in some detail later on.



MODEL INSTALLATION IN BASEMENT OF INSTITUTE OF THERMAL RESEARCH, BUFFALO, N. Y.

Vento heaters are located inside the galvanized housing, warming air forced through by electrically driven fan.

While a certain amount of simple data relating to the design of systems of this kind will be given, the plan proposed is to make this rather brief and devote the greater part of the article to the general arrangements which have been found most satisfactory for different classes of buildings, thus assisting the architect in making a selection of a system for any given set of conditions.

### FANS

The fans used for hot-blast heating are almost entirely of the centrifugal type, enclosed in steel plate casings. They are of two general forms known as the "paddle wheel" and "multi-vane."

The first of these is the older, and is probably more widely used than any other, although it is being rapidly superseded in new work by the multi-vane fan, owing to the smaller size of the latter for a given capacity and its higher efficiency.

The paddle wheel fan has been more or less standardized in design by different makers so that general data is of some value for approximating the size, speed and horse power, under given working conditions.

The multi-vane fan, on the other hand, varies considerably in design and operation, hence it is best to obtain all data as regards its action from the makers for any particular case under consideration, furnishing them with the volume of air to move, and a rough sketch of the size and arrangement of the distributing ducts.

In a general way, the cubic space required by a

BUFFALO PLANT OF NATIONAL LAMP WORKS
Note method of running air supply ducts.

multi-vane fan will be approximately one-half to two-thirds that required by a paddle wheel fan of the same capacity, and for the same size outlet will deliver the same volume of air at about 65 per cent. of the tip speed, and will require approximately 80 per cent. of the power.

### Data for Paddle Wheel Fans

For fans of average proportions, the volume of air moved may be computed by the following formula:

$V = 2 \times D \times N \times A \times B$; in which

V = cubic feet of air discharged per minute.
D = diameter of fan wheel, in feet.
N = revolutions per minute.
A = a factor depending upon the diameter of fan. (*See Table I.*)
B = a factor depending upon the resistance produced by the air ducts. This may be taken as 0.6 for the conditions found in shops and factories when the duct arrangement is as shown in Figs. 1 and 2, and 0.7 for systems like Figs. 3, 4, 5 and 6. (*See Editor's Note.*)

If the size and volume of air are given, the speed may be obtained by the following, in which the symbols are the same as before:

$$N = \frac{V}{2 \times D \times A \times B}$$

Table I.

| Diameter of fan, in feet | Value of "A" in formula |
|---|---|
| 3 | 2.9 |
| 3½ | 3.9 |
| 4 | 5.0 |
| 4½ | 6.2 |
| 5 | 7.6 |
| 6 | 10.7 |
| 7 | 14.4 |
| 8 | 18.6 |

### Example

What volume of air will be delivered per minute by a 6-foot fan running at 300 r.p.m. in connection with a shop system of the general type illustrated in Fig. 1?

$V = 2 \times 6 \times 300 \times 0.6 \times 10.7 = 23{,}112$ or 23,000 cubic feet, in round numbers.

The horse power for driving a fan depends upon

NOVEL INSTALLATION IN FORD MOTOR CO. PLANT

In this case the columns have been utilized as ventilating ducts.

the diameter, speed and the resistance operated against. Table II gives data from which the horse power may be approximated. The figures in the table are for fans discharging directly into the atmosphere without the use of ducts.

For the conditions of factory work, multiply these figures by 0.7 when "B" in the formula = 0.6; and by 0.8 when "B" = 0.7.

TABLE II.

| Dia. of fan, in feet | Revolutions per minute | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 |
| | Horse power for driving fan | | | | | | | | | | | |
| 3 | | | | | | | | 3 | 3.5 | 4 | 4.5 | 5 |
| 3½ | | | | | | 3 5 | 4.5 | 5.5 | 6.5 | 7.5 | | |
| 4 | | | | | 5 | 6.5 | 8 | 10 | 12 | | | |
| 4¼ | | | | 6 | 8 | 10 | 13 | | | | | |
| 5 | | | 7 | 9 | 12 | 16 | | | | | | |
| 6 | | 10 | 14 | 20 | 27 | | | | | | | |
| 7 | 12 | 16 | 25 | 33 | | | | | | | | |
| 8 | 18 | 30 | 49 | | | | | | | | | |

EXAMPLE

What horse power will be required to drive the fan considered in the previous example?

Here we have a 6-foot fan running at 300 r.p.m., with a value of "B" = 0.6. From Table II we find that a fan of this size running at 280 r.p.m. requires 20 H. P. and at 320 it requires 27 H. P. Interpolating, we find that for 300 r.p.m., the horse power will be

$$\frac{20 + 27}{280 + 320} \times 300 = 24 \text{ horse power.}$$

FAN DRIVES

Ventilating fans may be driven either by steam engines, turbines, or electric motors, according to circumstances. When the exhaust can be utilized in the heater, an engine or turbine is usually more economical to operate where it is necessary to vary the fan speed to any great extent during different parts of the day. Where electricity is generated on the premises, motors are usually employed for all fan work, especially where ventilation is provided throughout the year, regardless of heating, and where the exhaust from the engine would be wasted during the summer.

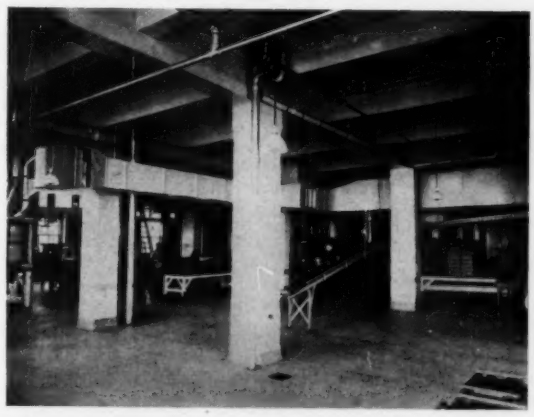
Again, the convenience of a motor often leads to its use, even at an increased cost of operation.

A simple, quiet-running engine is desirable for fan work, and may be either horizontal or vertical, as found most suitable. The matter of a belted or direct drive is also one of available space in industrial buildings, and either may be employed satisfactorily. Engines having the crank and connecting rod encased are especially adapted to this class of work, as it protects the bearings from dust and grit which are liable to be present to some extent when the engine is placed in the fan room.

Since it is frequently desirable to connect the motor directly with the fan shaft, direct current is preferable in ventilation work. When this is not available, and alternating current must be employed, it becomes necessary to use a belted or geared motor in order to secure the required speed reduction.

HEATERS

The radiating surface used in connection with blower work may be either in the form of wrought iron pipe or cast iron sections designed especially for this purpose. In either case, standard forms are generally employed so that the work of the architect



PORTION OF THE PLANT OF THE BEECH NUT PACKING CO., CANAJOHARIE, N. Y.

In heating buildings in which food products are prepared, not only fresh air, but that free from dust, and of proper humidity is essential. In the plant shown above the air is both washed and heated before delivery. In addition the humidity is under careful control.



XUM

HOT-BLAST SYSTEM INSTALLED IN PRINTING ESTABLISHMENT

This press room is both heated and ventilated by fresh warm air supplied through the register openings.

or engineer relates rather to their arrangement than to details of design.

The quantity of heat given off varies with the depth, the amount of surface, the velocity of air flow over it and the difference in temperature between the air and the steam filling the heater. The final temperature of the air depends upon the *depth* of the heater rather than the *amount* of surface.

For average conditions, say, with steam at 2 pounds gauge pressure, air entering the heater at zero, and passing through it at a velocity of 1,000 feet per minute, the final temperature will be approximately as follows for heaters of the depths listed.

TABLE III.

| Depth of heater, in rows of 1-inch pipe | Final temperature of air passing through heater |
|---|---|
| 4 | 30 |
| 8 | 60 |
| 12 | 85 |
| 16 | 105 |
| 20 | 122 |
| 24 | 137 |

The efficiency of the heater, or heat units given off per square foot of surface per hour, for different depths is given in Table IV, which is based on the same conditions as before; that is, air entering at zero, velocity of air 1,000 feet per minute, steam pressure 2 pounds gauge.

The working formulae for the design of main heaters are very simple, and are as follows:

$$H = \frac{V \times T}{55}; \quad V = \frac{55 \times H}{T}; \text{ and } T = \frac{55 \times H}{V}, \text{ in which}$$

H = total heat to be supplied, in thermal units.
V = cubic feet of air to be heated.
T = rise in temperature of air, in degrees.

TABLE III.

| Depth of heater, in rows of 1-inch pipe | Efficiency of heaters, in thermal units per sq. ft. of surface per hour |
|---|---|
| 4 | 2,200 |
| 8 | 2,000 |
| 12 | 1,800 |
| 16 | 1,600 |
| 20 | 1,500 |
| 24 | 1,400 |

The use of these formulae and Tables III and IV are best illustrated by working a practical example.

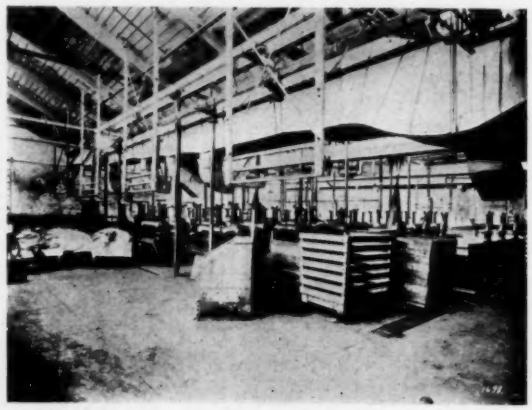
EXAMPLE

A factory building contains 240,000 cubic feet of space, and it is desired to change the air three times per hour when it is zero outside, and maintain an inside temperature of 70 degrees at the same time. The maximum heat loss through transmission and leakage is computed as 600,000 thermal units per hour by methods previously given. How many square feet of surface must the main heater at the fan contain, and how many rows of pipe deep must it be?

The total heat to be supplied per hour is that required to warm the incoming air from zero to 70 degrees, plus that lost by transmission and leakage. The total air quantity is 240,000 x 3 = 720,000 cubic feet per hour. To raise the temperature of this through 70 degrees requires

$$H = \frac{720{,}000 \times 70}{55} = 916{,}400 \text{ thermal units.}$$

Adding to this the loss by transmission and leakage gives a total of 1,516,400 thermal units per



A DYE HOUSE INSTALLATION

The design of heating and ventilating systems for buildings devoted to this industry requires careful study. The large quantity of steam constantly present tends to produce excessive condensation on all cool surfaces. This being especially detrimental to wood and iron must be to a large measure counteracted by the system installed.

hour. As this must be brought in by 720,000 cubic feet of air, the problem now becomes to what temperature must the air be raised to absorb this amount of heat? This is given by

$$T = \frac{55 \times 1{,}516{,}400}{720{,}000} = 116 \text{ degrees}$$

which added to the initial temperature of zero gives a final temperature of 0 + 116 = 116 degrees. Looking in Table III we find that a heater 20 pipes deep is required to give a final temperature equal to this. Also from Table IV it will be seen that a heater of this depth will have an efficiency of 1,500.

The total heat to be supplied is 1,516,400 thermal units. Hence 1,516,400 ÷ 1500 = 1011 square feet of surface will be required.

### Air Distribution and Re-circulation

The method of distributing the warm air under different conditions is best described by illustrating a number of typical buildings.

In certain plants where the rooms are well filled with operatives, or where the processes carried on are such that maximum ventilation is required at all times, the heater should be designed for giving the full air supply in zero weather. In other plants, where the requirements are not so exacting, satisfactory results may be obtained by re-circulating the full volume of air within the building in zero weather and gradually increasing the outside supply as the temperature rises, until the full quantity is taken from outside when the temperature reaches 25 or 30 degrees. In other cases, where the cubic space is large per occupant, it may be entirely satisfactory to recirculate the entire air volume for all outside temperatures below 40 or 50 degrees and depend on natural leakage for the fresh supply. The latest theories of ventilation lay special stress upon air movement and temperature regulation, and these are easily brought about when a fan system is employed. The main heater may be supplied with any steam pressure desired, but is usually made to utilize the exhaust the same as in direct heating. Temperature regulation may be secured in different ways, the most common being to shut off a part of the sections or by-pass a portion of the air around the heater by means of a special damper provided for this purpose.

### Another Arrangement

A good arrangement is a combination of these methods, using the steam valves for rough regulation and the by-pass for the finer changes which need to be made from hour to hour or at shorter periods during the day. In many cases the by-pass damper is operated automatically by a thermostat placed in the main room of the factory.

In buildings of several stories, or consisting of a number of rooms or departments requiring different temperatures, or having different exposures, each room must be regulated independently. This is ordinarily done, within certain limits, by varying the quantity of warm air admitted to the room, rough regulation for the entire plant being brought about by changing the air temperature leaving the main heater, this being under the control of the engineer.

When conditions are such that the air supply must not be cut down below a certain minimum, then the temperature of the room must be regulated independently of the air supply. When the system is arranged for the re-circulation of air, return ducts should be provided with inlets from different parts of the room. Otherwise the rotation of air will be localized in the vicinity of the fan and the circulation in other parts will be weakened. However, in buildings of medium size, with the warm air well distributed, return air for re-heating may be drawn directly into the heater casing, or at least through a comparatively short duct without interfering seriously with the distribution.

*It has been necessary to print Part III of Mr. Hubbard's article in two sections. Some of the figures referred to in this section will appear with the second section in the January 26 issue.*

*We, therefore, suggest to our readers that, after reading this first part of the discussion, they save these pages, and read the whole article again when the next issue appears on January 26.—Editor.*

## American Industrial Art

THE Fifth Exhibition of American Industrial Art will continue until January 30 at the Metropolitan Museum of Art. It is intended to be a demonstration of the practical or trade value of an art museum, a proof of the educational use made of museum objects for the advantage and improvement of current design in many industrial art branches. Objects and designs have been brought together which were made for the commercial market, but which, in a greater or less degree, owe their conception or method of execution to the study of museum originals or other resources in allied departments. An effort has been made to select examples in varied types of material, form, color, texture, and technique generally, in widely separated lines of production, yet all destined for the open market and all showing that museum study has been found worth while in terms of the selling product which results.

Manufacturers are urged to acquaint themselves with museum resources. Richard F. Bach, Associate in Industrial Arts, is ready at all times to assist manufacturers, designers, artisans, and craftsmen in objects of industrial art.



XUM

# The Garage Fire Record*

## Sprinklers Prove Ability to Extinguish Garage Fires

THE registration of motor vehicles in the United States has increased from about 48,000 in 1906 to 7,565,446 in 1919. The increase from 1915 to 1919 has been 5,200,000. The number of automobiles manufactured and placed in service is still increasing in geometrical ratio. In 1919 there was a total increase in registration of 23 per cent., and despite transportation difficulties the manufacturers' estimates for 1920 indicate the largest automobile production in the country's history.

FIG. 1. FIRE EXTINGUISHED BY ONE SPRINKLER HEAD, WHICH WAS STILL OPERATING WHEN THIS PICTURE WAS TAKEN

It is a self-evident fact that these automobiles are accommodated in garages; that garage construction has kept pace with the multiplication of the automobile. There are no satisfactory national statistics on garage construction, but automobiles are too valuable to leave in the open exposed to the weather, and it is reasonable to assume that garage facilities have increased in proportion to the automobiles. This mushroom growth of garages continues, unadvertised and unnoticed by the majority. Unlike housing construction, it has not been halted by increased prices or other difficulties. In fact, it is the largely held opinion that the automobile and its attendant extravagances are responsible at least in part for the present housing shortage. Such statistics as are available are not inconsistent with this contention. For example, in one American city for the first six months of 1920 building permits were issued as follows: Single houses, 1; apartment houses, 2; garages, 114.

Fire experience and municipal legislation have been responsible for great improvements in the modern garage over the converted livery stable and carriage repair shops of ten and fifteen years ago, but there remain many features requiring further betterment. And, with the continuing era of garage construction, there will still be opportunity to incorporate the best features in new garages. . . .

Gasoline is the inherent, fundamental hazard of the automobile and its storage and repair. Gasoline itself is not, properly speaking, a cause of fire, although it is frequently reported as such. However, it may be regarded as a contributory cause in the great majority of garage fires. For whatever the primary cause of fire, gasoline usually is responsible for its rapid spreading. The mitigating circumstance is the fact that the hazard of gasoline is now fairly well recognized, even if not fully realized. Large quantities are not ordinarily present inside the garage buildings except in proper containers (if automobile tanks are considered proper containers). The quantities present, although comparatively small, are, with the inadequate ventilation usually obtained, amply sufficient to occasion serious fires. And when a fire is one well under way, the gasoline tanks are destroyed, contributing their fuel. * * *

### Construction Features

Ventilation is perhaps the most important of all construction features. With adequate ventilation explosive gasoline vapors would not collect, and a large part of the fire hazard would be eliminated. For a discussion of garage ventilation see Charles E. Worthington's article, "The Common Sense of Garages," which appeared in the N. F. P. A. Quarterly last January.

Modern garage buildings are usually of concrete, and therefore fire-resistive. But there is a tendency toward very large areas. Horizontal areas are usually as large as possible and are in no way obstructed by partitions, while in the city garage occupying several floors there is seldom any attempt made to protect vertical openings. Although seldom used in garages, fire doors can give, and have given,

*Reprinted in part from the October Quarterly of the National Fire Protection Association.

excellent accounts of themselves in the journal of fire experience.

### Automatic Sprinklers

Claims have sometimes been made that the garage hazard is too severe for ordinary automatic sprinkler protection, and that application of water is likely to spread the fire by floating burning gasoline. Records show no basis for such opinion. In the files of the National Fire Protection Association there are reports of 134 fires occurring in sprinklered garages. The accompanying table shows that of the 134 there were only four failures, making a total of 130 fires, or 97.1 per cent., where the operation of the sprinklers were satisfactory. This compares favorably with a general average of 95.7 per cent. for all class of occupancy. Of the four failures, two were due to water shut off sprinklers and two due to obstructions to distribution. A review of all the garage fire reports in the files of the National Fire Protection Association has failed to disclose any instance in which burning gasoline was spread by water from sprinklers.

The accompanying photographs (Figs. 1 and 2) contrast the results of fire in sprinklered and unsprinklered garages. In the first case (Fig. 1), one sprinkler operated and extinguished and confined the fire to the car in which it started. Mr. H. L. Miner reports:

> Fire occurred in a one-story frame garage 50 by 100 feet in area, which contained twelve automobiles. Garage was locked up Saturday afternoon. Monday morning, when next visited, it was found that fire had occurred in one of the automobiles, cause unknown, possibly due to defective electrical system, or possibly from a smouldering fire due to smoking in the upholstery of the car. One automatic sprinkler to all appearances opened promptly and, although top of car was raised, thereby introducing considerable obstruction to distribution, the automatic sprinkler entirely extinguished the fire. Five feet from the automobile was a tank of compressed acetylene gas, also an oxygen tank. Photographs shows position of car in garage and oxygen and acetylene tanks referred to above. The automatic sprinkler was still operating when this photograph was taken. This is really a remarkable demonstration showing the effectiveness of automatic sprinkler protection, even though the sprinklers are working under a serious handicap.

Figure 2 shows what recently happened in an unsprinkled garage in Yakima, Washington. Note that the building had brick walls—incombustible outside walls, to the ignorant, give the all too frequent impression that a building is "fireproof." Mr. John Perry reports that thirty machines were destroyed, with an estimated loss on building and contents of $88,000, and considerable damage to adjoining buildings not included in this figure.

TABLE OF LOSSES ON GARAGE FIRES, NATIONAL FIRE PROTECTION ASSOCIATION RECORDS.

| | No. of Fires. | |
|---|---|---|
| Sprinklered: | | |
| *Small | 134 | |
| Large | — | |
| | | 134 |
| Unsprinklered: | | |
| Small | 250 | |
| Large | 129 | |
| | | 379 |
| Total | | 513 |

*Small loss is under $5,000.

The Table of Losses, showing a fairly large proportion of large losses in unsprinklered garage fires, while in sprinklered buildings, of the 134 fires on record there are no losses over $5,000, is another rather convincing argument for the sprinkler.

FIG. 2. A RECENT UNSPRINKLERED GARAGE FIRE IN YAKIMA, WASHINGTON

Contrast this fire, where thirty machines were destroyed, with that shown in Fig. 1, where one sprinkler head confined the fire to the car where it originated.

Thermal conductivity
Insulation, Thermal
Porete
Concrete
Asbestos
Gypsum

# Relative Heat Conductivities of Some Building Materials as Gypsum Board, Porete, Air Cell and Asbestos Board; Investigation conducted by

## Results That Represent What May Be Expected Under Actual Service Conditions

THE Verona Chemical Company of North Newark, N. J., has been conducting an investigation to determine by the air box method the relative heat conductivities of building materials. The tests of the different materials were conducted under identical conditions as nearly as was possible. A number of cube-shaped boxes were constructed of the different materials of practically the same dimensions which were approximately 8″ x 8″ x 8″ inside. The thickness of the walls was about one inch. An electric lamp was used as a heating element inside these boxes. The electric current was regulated by a rheostat and measured by accurafe voltmeter and ammeter.

### Measurements of Temperatures

The temperature inside was measured by two thermometers and outside by three thermometers and these thermometers were placed in the same relative position on each testing box.

The testing apparatus was set up in the basement of the laboratory, where the room temperature was fairly constant. No readings were taken during the first twenty-four hours in order to allow time for all conditions to reach an equilibrium. After this, readings were taken about every two hours.

The conductivities "K" as shown in the accompanying table in B. T. U. were calculated from the formula:

$$K = \frac{3.415 \times B \times W}{12 \times A \times (T\text{-}t)}$$

where "B" is the thickness of the walls in inches; "A" is area in sq. ft., "W" is the watts from the voltmeter and ammeter readings; and "T-t" is the difference between the inside and outside temperatures as indicated by the thermometers. Area "A" was considered to be the mean between the inside area and the outside area of the box. The thermal conductivity so measured represents the quantity of heat expressed in B. T. U., that flows through one square foot unit area of plates, through a unit thickness of one foot having a unit difference of 1 deg. Fahrenheit between its faces.

### Discussion of Results

The results thus obtained cannot be accurately compared with results of similar tests made under different conditions, because the conductivity "K" found in this way is not the heat transmitted only through the tested material of the thickness "B." It is the heat which passes also through the layer of air from the inside thermometer bulb to the wall, hence through the wall, and thence from the outside of the wall to the outside thermometer bulb.

The results will be different from results of tests where air contact has been excluded. They will also be different from tests, where fans or other devices have been used to keep the air in motion, thereby diminishing the resistance to the heat entering into the wall of the material to be tested. Inasmuch as the figures are arrived at under the conditions under which the materials are used ordinarily in building construction, they will give a good idea of the relative values of heat conductivity of the different materials tested.

RESULTS OF THERMAL CONDUCTIVITY TESTS.

| Material. | Box inside dimensions, ins. | Walls, mean thickness, ins. | Mean area, sq. ft. | Volume box, cu. ins. | Weight box, lbs. | Spec. gravity. | Weight per cu. ft., lbs. | Electric current consumed, watts. | Mean inside temper. Fahr. | Mean outside temper. Fahr. | Temper. diff., Fahr. | Heat conductivity. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete, 1 cement: 2 sand | 8⅛x8⅛x8 | 1 | 3.612 | 618 | 45.63 | 2.01 | 128 | 49.0 | 107.2 | 81.2 | 26.0 | 0.1760 |
| Gypsum board | 8¼x8¼x8¼ | 1⅛ | 3.619 | 588 | 21.25 | 1.00 | 62.5 | 31.6 | 115.7 | 82.7 | 33.0 | 0.0846 |
| Porete reinforced with exp. metal | 8¼x8¼x8⅛ | 1 | 3.564 | 546 | 19.40 | 0.98 | 61 | 44.5 | 131.5 | 88.1 | 43.4 | 0.0786 |
| Yellow pine, North Carolina | 8⅛x8⅛x8⅛ | 1 | 3.541 | 558 | 12.88 | 0.64 | 40 | 50.5 | 145.5 | 83.7 | 61.8 | 0.0719 |
| Air cell, asbestos board | 8x8x8¼ | 1⅛ | 3.530 | 572 | 4.40 | 0.21 | 13 | 29.7 | 156.0 | 78.0 | 78.0 | 0.0335 |
| Cork-board | 8x8x8 | 1⅛ | 3.470 | 566 | 3.83 | 0.187 | 11.7 | 6.82 | 94.9 | 72.2 | 22.7 | 0.0277 |



XUM

# Current News

## Happenings and Comments in the Field of Architecture and the Allied Arts

### Better Distribution of Aliens Aim of New Bureau

Through the establishment of a new bureau at Ellis Island, New York, in charge of economic and linguistic experts, better distribution of aliens, particularly with a view to avoidance of their congestion in large centers of population, is to be sought. The census this year reveals a tendency of the general population to flock to cities, and the new bureau, through its co-operation with state authorities, hopes to gain a much better distribution of aliens through rural communities.

The new bureau is to be known as the Division of Immigration Distribution and its chief, according to Immigration Commissioner F. A. Wallis, will probably be P. A. Donohue, an economic expert from the U. S. Department of Labor. Mr. Donohue has been a member of several boards of inquiry at Ellis Island, and it is believed he will be well fitted for his new position through his war work for the Federal Employment Bureau.

### Prehistoric Village Found

Discovery of the ruins of a prehistoric village and cemetery, in which were many relics of great value, in the Navajo country in New Mexico, has been announced by the American Museum of Natural History. The discovery was made by an exploration party headed by Earl H. Morris.

Fragments of polished pottery, glistening in the sun, led the party "by mere chance" to the new discovery. Mr. Morris wrote to headquarters here. Hundreds of pottery vessels of artistic design and scores of ancient tombs, which revealed many interesting habits of living, were unearthed, he said.

"There had been more than twenty dwellings in the village," he said, "varying in size from four to as many as fifty rooms."

### In Prague

In Czechoslovakia, the system of locking up a house is very peculiar. There are usually two very inferior locks on an outside door, which is further fastened on the inside with a small chain. The chain is considered necessary, because anyone who has a dozen or so keys could go about and unlock most of the doors in the street. The keys are always large and unwieldly things, frequently 5 or 6 inches long.

There would be some local conservatism to combat in attempting to introduce a really good spring lock, but there is no doubt that they are much needed. Furthermore, there will soon be a great deal of building in Czechoslovakia, especially in and about Prague. The needs of the rapidly growing city have not been satisfied by the existing office and dwelling accommodations, and building has been at a standstill for several years. It is now beginning to revive.

### Pennsylvania Academy Annual Exhibition Announced

The 116th annual exhibition of the Pennsylvania Academy of Fine Arts will open to the public on Sunday, Feb. 6, 1921. It will close on March 27. Press view and varnishing day will be Saturday, Feb. 5. The reception and private view will be given in the evening of the same date. The Artists' Evening will be held on Feb. 12.

The usual long list of prizes, medals, etc., is announced. The honors include the Academy gold medal of honor, the Temple fund and gold metal, the Edward T. Stotesbury prize of $1,000, the Walter Lippincott prize of $300, the Philadelphia prize of $250, the Mary Smith prize of $100, the Jennie Sesnan gold medal endowed by Elizabeth W. Roberts, the Carol H. Beck gold medal, the Lambert fund and the George D. Widener memorial medal.

The members of the jujry are: Robert Vonnoh, chairman; Cecilia Beaux, Frank W. Benson, Hugh H. Breckenridge, Adelaide Cole Chase, William J. Glackens, William M. Paxton, William Ritschel, Robert Spencer, Helen M. Turner, Carroll S. Tyson, Jr., A. Stirling Calder, Charles Grafly and Albert Laessle.

### Famous Workhouse Closes

St. George's workhouse, just south of London bridge, where Oliver Twist had the audacity to ask for a second helping of thin gruel, has been closed by the poor law authorities and the inmates have been transferred elsewhere. The gruel, of which Dickens' child hero and his fellow sufferers partook, was made in a copper cauldron, which is to be presented to the Southmark Borough Council's museum.



XUM

## Gobelin Works Admit Women

For the first time since the famous Gobelin tapestry works were established in France, back in 1664, women are now being taught to make tapestries.

## Danes Erect Obelisk

An obelisk of granite 70 feet high is to be erected in Denmark as a memorial to the many thousands of American and Allied soldiers of Danish descent who died in the World War. It has been estimated that about 30,000 men of Danish blood fought in the American armies in France and that about 20,000 Danes fought in the Canadian, Australian British and French armies.

The proposed obelisk will rest on a base twelve feet high, on one side of which will be two women's figures, one elderly, the other young, both with slightly bowed heads, expressing the sorrow of the motherland and her emigrant daughter for those who died in war. On another side will be an American eagle with the Star Spangled Banner, and in addition there will be bas-reliefs of typical war scenes from the American and Allied fronts.

## Bridge Resists Floods for Ages

In Foochow, China, the city of the white pagoda, is the "Bridge of Ten Thousand Ages." Endless time and labor must have been expended on the bridge, which is one thousand years old, states a report in the Chicago *News*. It is all of granite, each stone roughly carved to fit its neighbor without a bit of mortar and to resist the river in flood and ebb. The massive piers, ten feet thick, piles of rough hewed stone, are like inverted pyramids, buttressed on the river sides and on the inner sides, each layer of rock extending a foot beyond the layer below. Twenty feet is the widest span between any pair of the seventy-five piers and nothing wider than a sampan or raft passes on the turgid Min river.

Immense slabs of granite are the spans between the piers. Countless silken slippers, bare feet of chair bearers and straw sandals of sweating coolies have worn the surface smooth, while grass and wild shrubbery grow in the crevices of the piers and around the carved lions and dragons on the posts of the ponderous stone handrail. The roadway is no wider than an automobile.

But this picturesque bridge is to be replaced by a grim structure of steel—for automobiles, carriages and trucks and broad roads from the country have come to Foochow. The shifting bed of the muddy Min is to be dredged and ocean steamers will come to the city, instead of anchoring fourteen miles below.

## Reconstruction in Belgium

Of all the warring countries in Europe none have returned to their pre-war activities in a measure comparable to Belgium, according to recent Commerce Reports. When the armistice was signed the country found itself with a third of its factories ruined. In transportation essentials, 2,000 kilometers (1,250 miles) of railroads, 1,800 bridges, and 600 kilometers of canals had been destroyed, 60,000 railroad cars and 2,500 locomotives taken by the Germans, and the telegraph and telephone systems ruined.

Progress made in the past 18 months toward reconstruction is so phenomenal that within the next six months all pre-war industries excepting steel plants will have attained, where they do not already exceed, the production of pre-war years.

Practically all railway trains in the country are running on pre-war schedules, the roadbeds and bridges having been for the most part repaired or reconstructed.

Agricultural activity commenced immediately after armistice was signed, with the result that crops produced in 1919 fully equalled those of 1913. As an evidence of the intensity with which Belgians applied themselves to work, it is interesting to note that, on the termination of war, there were upward of 800,000 persons receiving chomage (unemployment wage), while at present the number has been reduced to less than 200,000.

Much of this remarkable progress is due to the activity of the Recuperation Committee which has succeeded in recovering most of the machinery taken away by the Germans.

Reconstruction has been but little handicapped by the few strikes occurring, and there is little or no spirit of Bolshevism among the inhabitants.

## Personals

McCluer & Griffith, architects, formerly Dexter & McCluer, are now operating at 401 Canby Building, Dayton, O. Mr. Dexter has retired from the firm.

A. H. Ebeling, architect, has moved his office from 1106 West Fifteenth street, Davenport, Ia., to 818-9 Kahl Building, that city.

The K. L. Hullsick Company, architecture and engineering, has opened an office at 400 Flatiron Building, Norfolk, Va.

A. E. Norman, architect, formerly located at 1526 Devon avenue, Chicago, Ill., is now practicing at 1531 Devon avenue, that city.



XUM

# Weekly Review of the Construction Field

## With Reports of Special Correspondents in Regional Centers

NOTHING is worse than the hypocritical optimist.

The fellow who shouts optimism from the housetops and tells the truth in the secret places is the most dangerous factor in any industrial community. If a market for a given commodity is weak, and continues to be weak, it does no good, and much harm, to insist that "conditions are improving" and "are better." No harm comes from telling an industrial truth. The leaders in industry and finance are leaders because of their foresight. That is their stock in trade. Upon that their present and future business reputations rest and always will rest. They can no more risk injury to it than an architect can risk injury to his reputation by insisting that an unsafe building is safe.

It was for precisely that reason that this journal published the opinions of prominent industrial and financial leaders regarding the future of both industry and finance. When men such as Judge Gary, Daniel Guggenheim, and Francis H. Sisson speak of the near future with confidence, one may rest assured that there is little to worry about the fundamental soundness of that future. It is petty and of no use to point to existing conditions as arguments against the optimistic opinions of these men. Their present importance and value in the industrial scheme was achieved by the keenest sort of foresight. It is as keen today as it ever was. Perhaps even keener.

Upon what do these men base their optimism?

Such a question may seem a bit incongruous after granting them a sort of foresight not possessed by the average man. There is no way of knowing upon what they have based their opinions. But there are salient facts in the industrial situation—the price problem, for example—which could be taken as a basis for industrial optimism by any man possessed of common sense and that sort of reasoning power which sees more than the printed word or price.

The table shown below represents wholesale commodity prices for 17 commodities which have been chosen for their representative character and their relation to fundamental business conditions. The figures were compiled by the National Bank of Commerce in New York, and are but a small part of a chart presented by that bank in its January house

| Commodity. | 1920 Jan. | Feb. | Mar. | Apr. | May. | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | 1914 Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATTLE**— | | | | | | | | | | | | | |
| Fair to choice native steers, Chicago[1] | 14.05 | 13.35 | 13.30 | 13.90 | 12.30 | 15.90 | 15.50 | 14.85 | 15.50 | 14.70 | 11.25 | 9.50 | 8.60 |
| **COAL**— | | | | | | | | | | | | | |
| Anthracite, No. 1 buckwheat, f. o. b. lower ports, N. Y.[2] | 5.25 | 5.50 | 6.00 | 5.75 | 5.75 | 6.30 | 6.50 | 6.50 | 8.00 | 8.00 | 8.00 | 8.00 | 2.25 |
| Anthracite, stove, f. o. b. mine[2] | 6.60 | 6.60 | 6.60 | 6.60 | 7.70 | 7.50 | 7.65 | 7.75 | 8.00 | 8.00 | 8.00 | 8.00 | 4.00 |
| Bituminous, run of mine, f. o. b. mine Fairmont, W. Va.[2] | 2.80 | 2.80 | 2.80 | 4.25 | 5.50 | 9.50 | 12.00 | 12.00 | 10.75 | 10.75 | 5.50 | 4.00 | .85 |
| Pittsburgh District[2] | 2.35 | 2.35 | 2.35 | 4.25 | 5.25 | 8.50 | 10.00 | 11.00 | 9.00 | 9.00 | 5.00 | 3.75 | 1.30 |
| **COPPER**—Electrolytic, early delivery, New York[3] | 19.25 | 18.50 | 18.00 | 18.75 | 18.37½ | 17.87 | 18.75 | 18.62½ | 18.12½ | 16.25 | 14.50 | 13.75 | 14.12½ |
| **CORN**—No. 2 mixed, Chicago[4] | 1.49 | 1.43 | 1.46 | 1.68 | 2.15 | 1.82 | 1.52½ | 1.60 | 1.37½ | .95 | .83½ | .72 | .62½ |
| **COTTON**— | | | | | | | | | | | | | |
| Middling, spot, New Orleans[3] | 40.25 | 39.25 | 41.00 | 41.50 | 40.25 | 40.75 | 39.00 | 34.50 | 28.50 | 20.25 | 18.25 | 14.75 | 12.88 |
| **HIDES**— | | | | | | | | | | | | | |
| Green salted packers, No. 1 heavy native steers, Chicago[3] | 40 | 40 | 37 | 35 | 36 | 35 | 30 | 28 | 28 | 25 | 23 | 20 | 17¾ |
| Calfskins, No. 1, Chicago city[3] | 80 | 70 | 50 | 55 | 50 | 35 | 35 | 27½ | 28 | 18 | 18 | 15 | 21 |
| **HOGS**—Good merchantable—pigs & rough stock excluded, Chicago[1] | 14.70 | 14.80 | 14.95 | 15.10 | 14.50 | 14.80 | 14.80 | 15.05 | 16.20 | 14.90 | 12.60 | 9.10 | 8.25 |
| **IRON and STEEL**— | | | | | | | | | | | | | |
| Pig iron, basic, Valley furnace[2] | 37.00 | 43.00 | 41.00 | 42.00 | 43.00 | 43.50 | 46.00 | 48.50 | 48.50 | 46.00 | 38.50 | 33.00 | 12.50 |
| Steel billets, open hearth, Pittsburgh[2] | 45.00 | 58.00 | 60.00 | 65.00 | 65.00 | 65.00 | 65.00 | 60.00 | 60.00 | 55.00 | 50.00 | 5.00 | 20.00 |
| **LEAD**—Pig, early delivery, N. Y.[3] | 8.75 | 9.00 | 9.37½ | 9.00 | 8.50 | 8.65 | 8.60 | 9.25 | 8.00 | 7.60 | 6.60 | 4.75 | 4.10 |
| **PETROLEUM**—Crude, at well | | | | | | | | | | | | | |
| Pennsylvania[5] | 5.00 | 5.50 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 2.50 |
| Kansas-Oklahoma[5] | 3.00 | 3.00 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 1.03 |
| **RUBBER**— | | | | | | | | | | | | | |
| Plantation, first latex crepe, N.Y.[6] | .53½ | .48 | .48½ | .45 | .38 | .38 | .33 | .31½ | .25 | .24 | .20 | .17½ | .56 |
| Para, upriver fine, New York[6] | .49 | .45½ | .42 | .42 | .39½ | .37½ | .34¾ | 32½ | .27 | .24½ | .22 | .19¼ | .73 |
| **SILK**—Shinshiu No. 1, New York[6] | 16.25 | 14.80 | 13.65 | 11.70 | 8.15 | 6.50 | 6.50 | 5.40 | 6.25 | 6.40 | 6.30 | 6.20 | 3.80 |
| **SPELTER**—Prime western, early delivery, St. Louis[3] | 9.10 | 8.70 | 8.60 | 8.45 | 7.75 | 7.50 | 7.85½ | 8.00 | 7.75 | 7.30 | 6.37½ | 5.75 | 5.10 |
| **SUGAR**—96° centrifugal, N. Y.[3] | 13.04 | 12.04 | 11.54 | 18.56 | 21.57 | 19.56 | 18.31 | 13.04 | 10.78 | 8.03 | 6.51 | 4.63 | 3.29 |
| **SULPHURIC ACID**—66° Be., bulk, sellers' tank cars, East'n points[7] | 20.00 | 20.00 | 20.00 | 20.00 | 21.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 21.00 | 20.00 | .... |
| **WHEAT**— | | | | | | | | | | | | | |
| No. 1 northern spring, Chicago[4] | 3.10 | 2.55 | 2.60 | 2.95 | 3.30 | 2.95 | 2.95 | 2.66 | 2.46 | 2.22½ | 1.88¾ | 1.61¾ | .91½ |
| No. 2 red winter, Chicago[4] | 2.65 | 2.40 | 2.47 | 2.75 | 3.06 | 2.95 | 2.85 | 2.56 | 2.49 | 2.39 | 2.11¾ | 2.00 | .96½ |
| **WOOL**—Clean basis, Boston | | | | | | | | | | | | | |
| Ohio fine delaine[6] | 2.30 | 2.35 | 2.35 | 2.35 | 2.25 | 1.85 | 1.74 | 1.65 | 1.50 | 1.30 | 1.25 | 1.12 | .56 |
| Ohio ¼ blood[6] | 1.07 | 1.05 | 1.05 | 1.10 | 1.00 | .80 | .79 | .75 | .70 | .60 | .57 | .45 | .39 |

[1]Dollars per 100 lbs. [2]Dollars per gross ton. [3]Cents per lb. [4]Dollars per bu. [5]Dollars per bbl. [6]Dollars per lb. [7]Dollars per net ton.

organ. Any architect would profit considerably in a careful study of that chart. There is a great business sermon in it.

The writer would respectfully direct attention to a careful comparison of the prices for the commodities indicated in January, 1914, and December, 1920.

Also to a careful comparison of the prices from January, 1920, to the end of the year.

And next week there will be considerably more to say about them. It would be a good idea to keep this issue at hand or to clip this chart. You will have occasion to refer to it frequently. It will be taken as a basis for a series of price discussions, the first of which, "The Architect's Relation to Price Declines," will appear in this department in the issue of January 26.

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*(Special Correspondence to* THE AMERICAN ARCHITECT)

SEATTLE.—Optimism, effervescent or otherwise, is not responsible for the brighter feeling in Pacific Coast business circles regarding the sudden change in mental posture toward reconstruction of buying for new commitments early in 1921. Lumber is believed to be at bottom from the fact that wholesalers have begun to buy. jobbers of building hardware are preparing to buy on the new price list reached when the independents shrunk away the premiums of wartime and touched the Steel Corporation levels, there is accumulating evidence of the return of confidence of buyers to building materials, and the farthest possible date at which resumption is now placed by many of the keenest minds in this territory is March 1, with proportionate symptoms of recovery during January.

There is no doubt whatever that during early December not a jobber in a hundred would have claimed, excepting for public consumption, that the coast conditions could change before midsummer. Revision of figures with the conclusion of stock-taking, increased inquiries with architects, larger activity of public building construction and homes, conviction that steel products can go no lower until after the 1921 placements have been cleared are factors that have built up the new atmosphere overnight. This feeling is increasing hourly.

Concededly among jobbers, with the facts at hand rather than sentiment or personal opinion, the New Year will be a buyers' and not an order-book year, and the educational trend and activity of selling organizations in building lines is being shaped to that end. Men in the field are being warned that now, as at no time since 1914, they will be expected to move rapidly and to meet keen competition for business, even to searching out the long-neglected and insular buyers. The old-time zest of getting orders has started.

Jobbers of building hardware, nails, sheets and pipe are today buying only light in order to ride out the earlier pauses during January, but as for accepting the Steel Corporation basis as fundamental and not subject to further change during this year, the thing is as good as done, and the jobbing trade feels its position secure when treating problems of the new building season.

The factor that has held off buying during the past 30 days, when delivery from the mills has come nearly to normal, is the dumping on the market by shipyards of pipe, bar, cleats, rivets, bolts and pipe, larger sizes predominating. These huge stocks, accumulated during the speed-up war period, are being offered under the market as the shipyards that bought them are being dismantled. The jobbing trade does not feel justified in buying even on the sound steel market when all these stocks are lying round loose at the mercy of any chance speculator.

There is on the coast today no shortage of building essentials. Cement, probably the last to show normal conditions, is being supplied in sufficient quantities to meet the needs of the hour. None care to accumulate stocks for the next 30 days.

Fully 50 per cent. of the fir lumber mills that closed for the holidays, supposedly for an indefinite time, will be in operation by January 15. Many reopened before New Year's day. A decline of a dollar in common dimension, or to $13.50 to the trade this week had been discounted in advance, and this, it is now felt certain, will be the last fall in prices for some time.

Wholesalers believe the time is ripe for buying, and will start doing so during January. Should a drop of another dollar occur, as a minority now predicts, wholesale buyers say it will only be necessary to hold their purchases past the next soft spot in order to realize a profit. Their conviction that recovery in the lumber market is now due is their foundation for proposed buying activity.

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*(Special Correspondence to* THE AMERICAN ARCHITECT)

CHICAGO, Jan. 17.—It is becoming increasingly apparent that the only obstacle in the path of a great building revival in the Chicago district is the matter of price on lumber, labor and materials. And it is not so much a question of the actual cost as of the uncertainty now attending the whole price situation. Those who contemplate building, whether they be individuals or corporations, are apparently hesitating because they have no way of judging the stability of prices at this time and do not desire to make a building investment that will be periled by early and more substantial declines in the cost of everything that goes into the finished building.

If this fog of uncertainty and distrust can be lifted, there is no reason—in the view of the best posted men in the building industry in Chicago—why the

building program, so long talked of, cannot be successfully instituted at once.

Cost alone is holding back the bandwagon. Plans have been made; the need is very great, the money is available—only the indecision of the market in construction materials remains the unknown factor in the building equation.

Frankly, there is a feeling on the part of those who are about to invest in new construction work that prices have not yet dropped sufficiently and that a little waiting will bring the market to much lower levels.

Lumber, labor and the minor materials have been accused of attempting to take a small loss with such loud acclaim and such a blare of trumpets that the public will immediately assume that the rock bottom has been reached and that there is nothing more to expect in the way of price reduction.

The public, however, declines to take this point of view, and the psychological effect is to produce a buyer's strike which is just as keenly felt in the building trades as in shoes or ships or sealing wax, or any other of the lines that have suddenly slowed up as far as consumer demand is concerned.

The foregoing represents the darker side of the situation, but let a brighter point of view be unfolded.

The interests whose prosperity is gauged by the amount of building have seen the light and are now bringing themselves together with a view to settling the market and of laying the ghost of price uncertainty, once and for all.

The first step in this direction was taken in the Chicago territory by Edward Hines, a prominent lumber manufacturer, whose business sagacity and foresight have made him a leading figure in the lumber industry. Sensing this watchful waiting attitude on the part of the building public, he called a conference of lumber manufacturers from all parts of the country. They met in Chicago, January 5-6, and made a hasty summary of the situation, deciding in very short order that the lumber industry alone cannot swing the pendulum of price back to a normal stability. To the end that the mists of indecision may be cleared away, however, the lumber interests have called another conference—this to be held in Chicago January 21-22, at which all factors in the building materials field will be represented. Here all the manufacturers whose products go into the building industry will sit down in a heart-to-heart fashion in order to bring about as complete a clarification of price as is now possible.

At this conference lumber manufacturers, retail and wholesale lumbermen, manufacturers of paint, cement, stone, granite, building metals, shingles, laths, lime, gypsum, glass, brick, sand and gravel—every line in the building list will be present and the whole building impasse will be thoroughly considered, with price of materials as the crux of the whole conference.

That the meeting is going to be an Armageddon of disputatious views is thoroughly expected. Each trade is going to point out the utter impossibility of a further decline in its product, but out of the whole mass of conflicting opinion seems sure to come a concord of action that may give the desired result of stability of prices.

Labor is not going to share very prominently in the conference, but the element of labor is bound to come in for a great deal of discussion, and the general feeling is that the industry is going to be much nearer a normal basis of opinion after the meeting than is now the case.

Not content with engineering a general conference on the building situation, the lumber manufacturers, acting in concert with the National Lumber Manufacturers' Association, have recently sent a delegation of their leaders to Marion, where a conference was granted by President-elect Harding. The committee was given a two hours' audience, during which the side of the lumber industry in the housing shortage and the willingness of that industry to co-operate in a return to normalcy were presented to Senator Harding.

No program of tangible facts was presented at the Marion conference, and President-elect Harding did not express his views upon the pros and cons of the building situation, but he asked a great many questions indicating his very great interest and his anxiety to be thoroughly posted on the technical points of the discussion.

Another tangible result of the conference of the lumber interests recently held in Chicago is the announcement that a fund is to be raised within the industry to advertise lumber and its uses and to build up in the public mind the feeling of confidence that the industry is not attempting to impose unreasonable prices on lumber.

Another meeting of unusual interest is that of the Associated Building Contractors of Illinois, held in Chicago during the second week in January.

Although the week has been marked by meetings, conferences and discussions of lower prices for lumber and materials, the prices remain virtually unchanged.

Materials linger at old figures, with business very quiet, but with the factors in the trade quite hopeful as to the outcome.

Some reductions are in contemplation, it is said. Mixed paints are expected to show an early decline, following a cent a pound reduction in all leads, announced this week by leading manufacturers. Current lumber and materials quotations in the Chicago market are:

Yellow Pine:—B. & B. 1 in., $95 to $130; 13-16,



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3¼ flat flooring, $85 to $90; 2 by 4, 10 to 16 feet, No. 1 long leaf, $51; 2 x 6, $48 to $49; 2 x 8, $49 to $50; 2 by 10, $52 to $54; 2 by 12, $54 and $56.

Northern Hardwoods, carload lots, Chicago:

Birch, four ¼ No. 1 and 2, $155; select, $130 to $138; No. 1 common, $95 to $100; No. 2 common, $60 to $65; No. 3, $35 to $40.

Hard Maple, four ¼ No. 1-2, $135 to $140; select, $115 to $120; No. 1 common, $95 to $100; No. 2, $60 to $65; No. 3, $32 to $50.

Red gum four ¼ No. 1 and 2, $148 to $152; No. 1 common, $88 to $92; No. 2, $43 to $47.

Birch, four ¼ No. 1 and 2, $155 to $160; select, $130 to $139; No. 1 common, $95 to $100; No. 2, $60 to $65; No. 3, $35 to $40.

Douglas fir, 12 by 12, No. 1 up to 32 feet, $65 to $75; 14 by 14, $68 to $75; 16 by 16, $70 to $75; 18 by 18, $75 to $80.

Cement:—Universal, $3; Lehigh, $3.00; Portland, $3.00.

Bulk lime, $1.70 to $1.90; face brick, octagons, $68 to $75; fire brick, $32 to $40; 12 in. .24 to .27, 18 in. .46 to .54.

Crushed stone gravel $3.40 to $4; lake and bank sand-torpedo, $3.40 to $4.

Present important building operations in Chicago:

Federal Reserve Bank Building; excavation and preliminary foundation work well along; Royal Insurance Building; three theatre buildings in the Loop; Chicago Board of Education Building; Government Parcel Post Station; and the Fair's nineteen story building on Monroe Street.

The last three represent an outlay of nearly $5,000,000.

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(*Special Correspondence to* THE AMERICAN ARCHITECT)

BOSTON, Jan. 17.—If one were asked to name the outstanding features of the business situation in New England today he would be obliged to mention all those facts in our industrial life which come under the head of business readjustment. There is the slowing up in industrial and commercial activity as reflected in reduced railroad earnings, steadily decreasing bank clearings and increasing unemployment. Many plants in such centers as Bridgeport, Waterbury, Providence, Fall River and Holyoke are carrying a pay roll of one-third to one-half the amounts of four months ago. In the early months of 1920 clearings were running 25 to 30 per cent. ahead of the same months of last year. Recently they have in turn revealed a falling off of 10 to 14 per cent. compared with a year ago.

A 22½ per cent. cut in textile wages in New England was announced this week. In the steel trade, which so far has not cut wages, reduction is in the making.

The so-called consumer's strike will undoubtedly be called off as soon as there is any evidence that commodity prices have again reached a more stable basis. There does not seem to be as much quarrel today with the level of prices as there is in regard to the uncertainty as to whether the decline in commodity prices is over. For instance, no one will say that the fall in copper prices from 36 cents in the war period to 13½ cents has not been sufficiently drastic. But no one wishes to do much buying as long as the trend of prices is downward and not upward.

The Harvard University committee on economic research says: "Evidence of approaching business revival are not yet apparent in the news of the day, nor do we expect to see any very soon. There are considerations, however, which support the forecast drawn from our index chart that a revival of business will begin next spring, one being the fact that a number of raw materials, such as cotton, wool and leather, are selling much below recent costs of production and probably below costs that will rule next year, even with considerably reduced wages; another being the fact that the physical production, both mining and manufacturing, was less in 1919 and 1920 than in 1916, 1917 or 1918.

"Both of these considerations support the forecast that there will be a recovery in some prices at no distant date."

Statistics of building and engineering operations show that contracts awarded in New England from Jan. 1 to Dec. 15, 1920, amounted to $297,733,962, as compared with $235,356,000 in 1919; $146,703,000 in 1918; $195,443,000 in 1917; $201,259,000 in 1916; $171,820,000 in 1915, and $159,280,000 in 1914 for a corresponding period.

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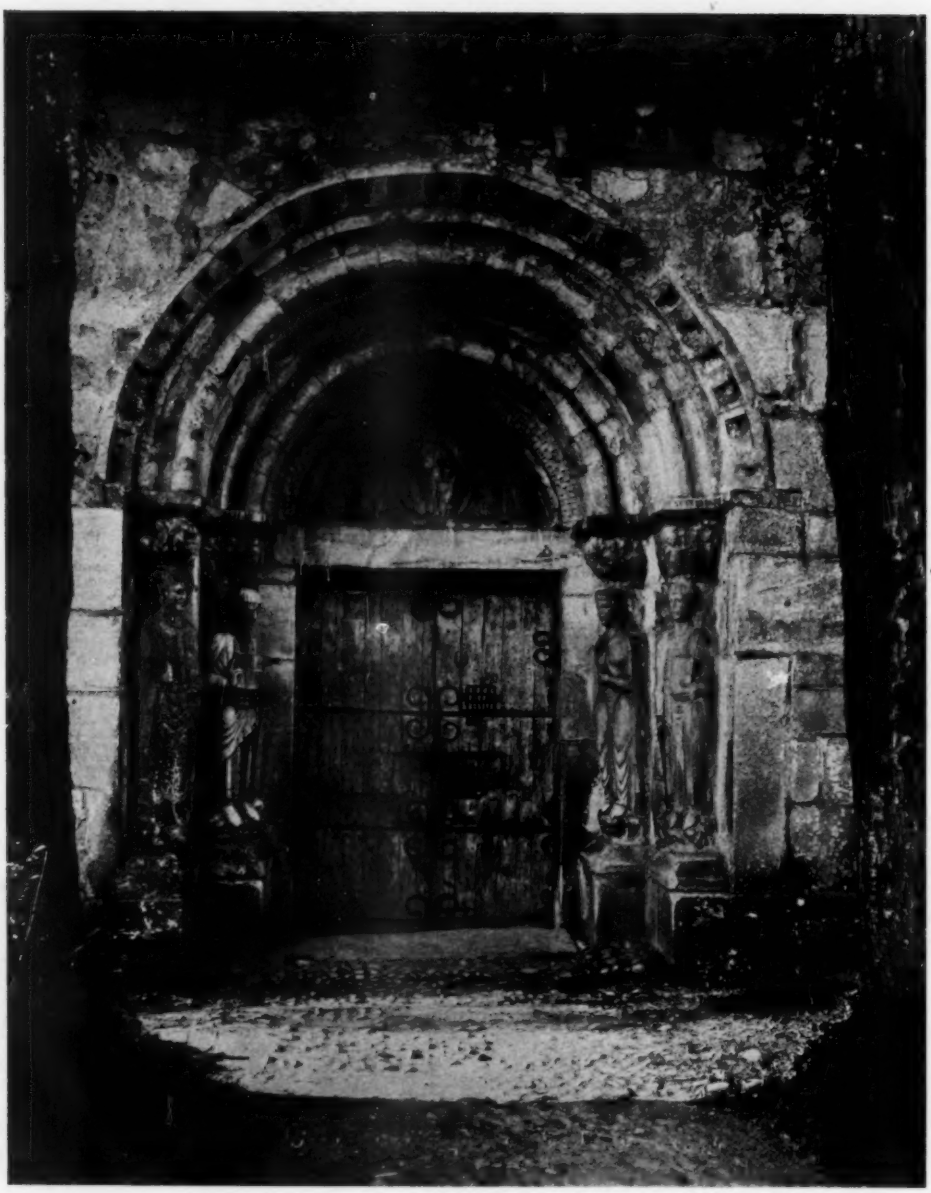

A FRENCH ROMANESQUE DOORWAY



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